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PRESENTED BY

Mr Andrew Carnegie

OLD COLONY BUILDING

INDEX.

Articles Marked "*" are Illustrated.

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NO. 1.

THIS is the season when the winter resort takes the place of the summer resort. Toboggans, skates and frosted ears are now in order. The street railway company that will spend five dollars a day in maintaining a skating pond, three acres in extent, will reap such a harvest of nickles, that it will wish winter was omnipresent.

BRIDGEPORT, Conn., has discovered a new point with reference to the enforcement of a statute, which may be of value in other places. Two employes of the Bridgeport Street Railway Company were arrested for sprinkling salt on the tracks, which was an alleged violation of a statute beginning, "No such company shall sprinkle any article of a decomposing nature on its tracks or rails, or wash them with brine or pickle, or allow it to be done," . . . The city court decided that the law did not allow a fine to be imposed on employes, as the company alone was liable, and the employes were not officials or stockholders.

ONE of the most absurd excuses for not permitting salt to be placed on street car tracks comes from Newport, Ky., where the mayor says it will cause the brick paving to decay. On the face of it the opinion is nonsense. Good paving brick will not absorb more than 2 per cent of moisture, while in the second place there are no chemicals in the analysis of the clay from which the best paving brick are manufactured, that can be injured

by the chemicals that enter into the composition of salt, so there is absolutely no truth in the statement of the mayor of Newport, that brick paving will be injured by salt. What if it was? Doesn't the street railway company have to foot the bills? There is no doubt but brick is the coming pavement for streets.

IN St. Louis has been inaugurated an ambulance service on the street railways for the purpose of conveying sick and injured to the various hospitals. One car is in service, running on a schedule, and is described and illustrated in this issue of the REVIEW. This service, the conception of Dr. George Homan, commissioner of health of St. Louis, will undoubtedly be adopted in other cities. Dr. Homan has had many difficulties to overcome which would have discouraged men of less perseverance, and he deserves great credit for establishing this humane service. President John Scullin of the Union Depot Railroad Company, should not be forgotten in this connection, for his generosity and progressive public spiritedness made it possible for Dr. Homan to carry out his ideas.

THERE was a strike in Washington, last month, on a horse line. The company found the conveyance of passengers via animal motors an expensive undertaking; and as they could neither increase the number of passengers or the rate of fare, were obliged to economize on expenses. Among the curtailed items was conductor's and driver's pay which was cut from \$2.03 to \$1.68 per day. At this the men rebelled and ditched the cars manned with new crews, which were mighty glad of a chance to earn the \$1.68 per diem. So far the case is no novelty, but the story is not complete without the statement, that numerous senators and representatives, by whom the line is much patronized, made no secret of encouraging the men in their efforts to block the road. This attempt to curry favor, on the part of professional vote seekers, is about as thin a piece of clap-trap as can well be, and deceives no one.

TESTING motors for faults is usually done with the wonderfully uncertain, but simple, "magneto" bell. Without wishing to cast any discredit on the part this little instrument has played, and always will play, in rough and ready, every day testing, we want to call attention at the same time to the very practical, simple, and accurate methods of testing, described by Mr. Fuchs in this issue. They depend on old and well known principles, and involve the use of nothing but three portable instruments and a rough resistance coil. Very many associate accurate testing with delicate instruments and a laboratory, and think the less work of the kind done in every day practice, the better. The tests described can be made in any car shed, and by their use a very accurate knowledge of the weak points on a motor can be obtained in about the time it takes to make a magneto test. At the same time, the results obtained are so much more definite, that much time and expense can be saved on repair work.

DURING the recent election, many a dollar was turned into the treasury of the street railway companies by the various political parties for the use of cars. In several towns cars were chartered for the use of bands, which kept going backwards and forwards over the various lines, tooting their horns, and making more or less melody and discord, which served to call the attention of everybody to streamers, giving the virtues of the various candidates. In cities where the women had the right of suffrage, cars were engaged for torchlight processions, as it were, only there were no torches, nor marching, in the muddy roads. In Detroit 600 women took part in such a procession, the mode of conveyance being electric cars, which were decorated in a manner to attract attention. These are two instances of how earnings can be increased. The bright, capable manager, is always on the lookout for new ways of filling his cars with passengers.

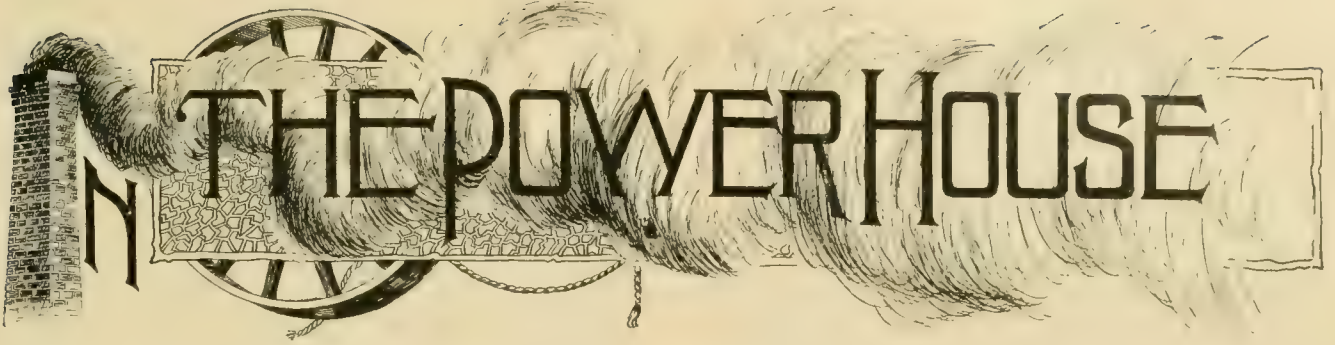
CONSIDERABLE attention is being paid by the railway companies of the larger cities, and by quite a number in the smaller towns, to the comfort of employes while waiting for the time to start on their trips. In this issue of the STREET RAILWAY REVIEW is the beginning of a series of articles on reading rooms. The benefits to the company of such an institution are much more than can be estimated in figures on so small an investment of money. The men feel more interest in their work, for the reason that they think the company does not consider them mere machines, but human beings, whose comfort is provided for in a pleasant way. When men are compelled to loaf in their idle time, they soon become careless, listless and lazy, neglecting their duties when at work. In time they get to be dissatisfied with their surroundings and stir up strife. Special attention is directed to the article in this number, which describes the elaborate employes' reading room of the Metropolitan Street Railway Company, New York.

THAT business is on a better basis than three months ago, can be demonstrated by a little observation and retrospection. From day to day there seems to be little change, but when a collection of days is reviewed, the result is often somewhat startling, and things have been found to have been in much better shape than was suspected. Until the latter part of September and early part of October, everybody seemed to be hunting for second-hand material. Since the middle of October the character of demand has changed. There is less hunting for bargains, but much inquiry for new goods, although buyers are inclined to offer low prices, which is natural. The situation has now reached its third stage of development. First came depression, when it was hard to give anything away, next was the second-hand stage, when those who were compelled to buy endeavored to supply their need at the least expenditure possible, and tried to be satisfied with second-hand articles. Now has come a period of healthy demand for new articles, which will go on increasing as the months of the year approach, when it is customary for buying to be large.

WHILE the pros and cons of air and electric brakes are being discussed, it is a good thing for the practical electric railway operator to stop and consider whether his present brakes are being kept in such shape as to ensure their utmost usefulness. A high grade of labor is employed on motor inspection on all well-regulated roads, but do the motor inspectors apply their best skill and intelligence to the brakes as well as the motors? We think usually not. The brake is a purely mechanical appliance which will do its work, after a fashion, whether it is adjusted or not. It is nothing uncommon to see several inches of extra slack on a brake chain, and the brakes are often left for months without adjustment to take up the wear on the brake shoes. This means that every time the brake is applied, two or three seconds of time are wasted in winding up the slack before the brakes are actually applied. It takes time enough to apply a hand brake at best, and it is the quickness of air brakes rather than their power that makes them superior. A motorman can easily slip the wheels if he is given time enough, but there is the difficulty. See that inspectors use as much care on the brakes as on the motors.

THE three-wire system is arousing much interest at present and therefore we feel justified this month in giving considerable space to a description of the work at St. Louis, and a few remarks on the system in general. The fact that it has for three years done good service at Portland, Oregon, did not seem to be known generally among electric railway men until recently, when Mr. Balch described the system there in our last April number. As we have said before there is undoubtedly an extensive field for the three-wire system, although it is not suited to all conditions. Inasmuch as nothing but the common standard apparatus is used with it, no radical move is required of a road to make the change. The three-wire system has some almost fanatical advocates and some equally fanatical opponents. It seems as if the system had been given enough of a trial at present so that both classes of electricians would begin to see the error of their ways. Like everything else this plan has its drawbacks, but that it is practicable for every day operation and has some decided advantages can not be denied by any one with his eyes open. There is a report abroad that the system was tried at Milwaukee several years ago. As near as we can learn this is not the case. Two different railway systems there once operated with trolley wires of different polarity and with disastrous results to overhead crossings. This was practically a three-wire arrangement, but it could hardly be called an intentional trial of the three-wire system. The trial at St. Louis is interesting on account of the very adverse conditions there owing to the crossings with other roads. The men behind it deserve credit.

Robert E. Jenkins has been selected president of the Metropolitan Elevated Company, Chicago, for the unexpired term of the late John Worthy.



This department is devoted to the construction and operation of electric railway power houses. Correspondence from practical men is specially invited. Both the users and makers of power house appliances, are expected to give their views and experiences on subjects within the range of the department.

The writer recently had the pleasure of visiting the power plant of the Cass Avenue & Fair Grounds Railway at St. Louis, which was the first railway plant in the world to use throughout generators direct connected to Corliss engines. At the time the contract was let in September, 1892, this was a very bold move on the part of the management, but since the station was started in July, 1893, there has never been cause to regret this action, while many another company wishes that it had possessed the courage to make the move sooner. To the inhabitant of a belt driven station it is a novel sensation to step into this plant where two 1,000-horse-power units are running with hardly a sound save the click of the valve motions. Direct connection has come to stay, and its popularity, even before its thorough trial, was something remarkable. Now that its success has been practically demonstrated it is gratifying to know that its popularity is deserved and that no mistake has been made in its adoption.

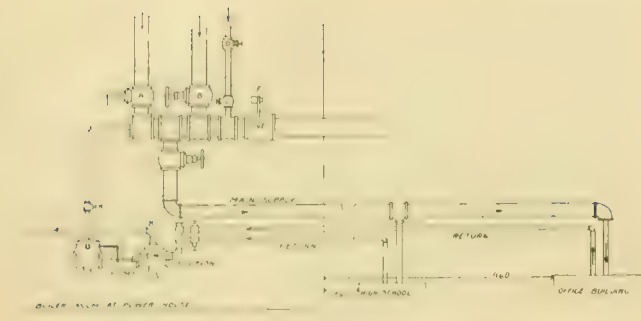
The governing of water wheels for electric railway service is discussed in a very impartial and practical way by Mark A. Replogle elsewhere in this department. The principles of water wheel government do not seem to have been very well understood in the building of water power plants and the important part that the arrangement of the penstock plays in the government should make every man who is putting in a water power plant stop and consider the effect his design will have on the speed regulation. There are certain undeniable principles laid down in Mr. Replogle's article that make it impossible to obtain very good regulation with a water wheel governor when a long nearly horizontal penstock is used. This is a point to be remembered. When a water power plant is once installed, it often happens that to change it means to rebuild it entirely. Under certain conditions the only way to govern satisfactorily, is by electrical means which keep a constant load on the generator. Very close regulation by hydraulic means, is, as is shown by Mr. Replogle, an impossibility, but if the

designer appreciates the conditions necessary to good regulation an approximation to steam engine government can be reached by hydraulic means.

The STREET RAILWAY REVIEW has always advocated the improvement of all opportunities to enlarge the revenues of a small road by selling heat and power. It is with pleasure that we note that the Menominee Electric Light, Railway & Power Company, is quite successful in the development of this resource. Exhaust steam is furnished for heating the high school buildings, a distance of 560 feet from the power house, and for a business block, 960 feet from the power house. The former has 2,500 square feet of radiation, while the latter has 5,600 square feet.

The Warren Webster vacuum system is used. The engines and pumps all exhaust into a header in the boiler room. From this header the main supply pipe runs to the two buildings. The pipe is laid in a box filled with sawdust about 3 feet below the surface of the ground. For drainage purposes, the supply pipe is given a slight slope toward the buildings, and the return is given a dip toward the power house. At the lowest point the supply is connected to the return by a bleeder. The valve in the bleeder is left open only while draining off the condensed water in the underground pipes. The condensed water from the buildings is pumped back to the power house, and delivered into a receiving tank at a temperature of 180 degrees. The boilers are fed from this tank. Details are shown in the accompanying sketch. The vacuum pump not only relieves the engines of all back pressure, but keeps the steam in circulation throughout the entire system. Edward Daniell, superintendent of the company, writes: "The expense of operating is nothing, unless the engines are stopped for some cause, when we would have to furnish live steam. Our contracts for heating the buildings mentioned will pay first cost in two and one-half years—not a very bad investment for these times. I believe our company is the only one north of Chicago furnishing exhaust steam for heating. All users of steam boilers will recognize the benefit of having a supply of almost pure, hot water, which we get from the return condensation."

There certainly seems to be a great opportunity for developing this resource. No difficulty ought to be experienced in making the consumer see the advantage of



A and B, engine exhausts—D, live-steam connection—C, pressure-reducing valve—E, exhaust to atmosphere—F, automatic back-pressure valve—G, discharge to hot water tank.

renting steam heat, which can be furnished to him for less than his coal bill, and, at the same time, is so much more satisfactory than furnace or stove heat, while, if he has a steam plant the expense of keeping a man to run it will be saved, in addition to the fuel, water tax, repairs, and other incidental expenses. In Menominee, where the temperature is low in the winter, no difficulty is found in sending the steam 1,400 feet satisfactorily, serving 8,100 square feet of radiation, and returning the condensation at a temperature of 180 degrees to the power house. This simply shows how practical the plan is.

* * *

The Government of Turbines Driving Railway Generators.

BY MARK A. REPLEGLE.

In response to the REVIEW's invitation I will offer some observations concerning the use of water power and its government in operating electric railways. The failure to govern water power successfully by the ordinary methods has led to persistent inquiry for a better system of governing. The writer was engaged in the work of governing water-wheels when the first attempts were made in the United States to operate electric roads by water power, and suffered with others the humiliation of indifferent success. It then occurred to the writer that a very serious problem had been encountered. Subsequently several methods have been employed with varying success.

The unsatisfactory results obtained in attempting to govern a number of plants induced the writer to make a series of investigations, from which the following deduction was made:

Gravity being a constant force cannot put the required additional volume of water in motion quickly enough to meet the demands of an instant increase of electric load.

This is more easily understood in view of the facts that water at rest represents no power, and that gravity charges water with power only by the act of giving it motion. This power is in turn transferred to the wheel, the buckets of which bring the water to a state of rest, receiving the power less the friction. After arriving at the above conclusion it was evident that no further progress could be made in the government of turbines in the

ordinary way for the propulsion of electric cars. About this time it occurred to the writer that additional power might be obtained by increasing head without increased quantity of water. That is to say, a cubic foot of water falling a given distance represents one-half the power represented by the same quantity falling twice the distance.

Upon this principle is based the system herein described, which the experience gained during the past two years has proven to be a stride in the right direction. In practice the system employed involves the increase of head along with a corresponding increase of quantity of water, thereby obtaining additional power in double the ratio of that obtained by increase of quantity only. The above conditions are actually brought about by a governing gate designed and patented by your correspondent. In its simplest and most efficient form it consists of a conoid and sleeve attached to the draft tube of a turbine water-wheel. It will be understood that this is a distinct and separate gate, and has no connection whatever with the ordinary inlet gate of the turbine. It might be termed a discharge gate were it not distinguished by a construction that gives it the governing qualities referred to. Hence it is more properly termed a governing gate. A conoid of proper shape, having its base diameter equal to the outside diameter of draft tube, is placed directly under the draft tube of the wheel. It is placed far enough below to permit a full and easy discharge of water, and serves as a diffuser when not employed for governing purposes. It is supported by masonry from beneath, or by suspension rods from above, making it permanent or immovable. A cylinder or sleeve gate that will slide loosely on the outside of the draft can cut off the discharge by closing down on the base of the conoid, or release it entirely by sliding up on draft tube. This sleeve is operated by the gate regulator by means of rods or cables.

In practice the ordinary water-wheel gate is opened wide enough to admit water sufficient to carry the maximum load, and remains stationary. The governing gate below the wheel will choke or release the discharge so as to keep even speed while the load on the dynamo varies. It can plainly be seen that when the sleeve gate is lowered it backs the water up on to the wheel and lowers the head or water pressure to that extent, and at the same time cuts off the quantity of supply by reducing the velocity through the stationary guides or nozzles. Thus the power is cut off two ways—first, by reducing the head, and second, by reducing the quantity of water. The beneficial effect, simply stated, is this: We can open the governing gate as fast as it is practical for gravity to supply water, and, since we are adding to the head, at the same time we get power from that source also. The sum of the two supplies equals about double that of getting power by increasing the volume of water alone. There are several more economical features relating to government that are brought about by this peculiar device, but it will require considerable space to make them clear, so no attempt will be made at this time

to explain them. I will state here that there is a small loss in the efficiency of the water when the governing gate is cutting off power, but the efficiency increases to its maximum as soon as the power is required. In fact, the system is valuable for governing railway power plants on this account. Gravity cannot make changes in the flow of water quick enough for the demands, but with the governing gate the changes in power can be made in double the ratio that gravity can affect the water.

After a successful application of this system to a small power plant by the writer, the Ithaca Street Railway decided to apply it to the turbines driving their power generators. The wheels referred to are of the new American pattern, twin horizontal type, working under a 90-foot head, and develop about 400 horse-power. A very unfavorable condition of this plant is a closed flume, about 600 feet in length. The detrimental effect of this flume is, that each cubic foot of water, under the direct action of gravity, must overcome the inertia of more than $6\frac{1}{2}$ cubic feet of water moving in a horizontal direction when a change of load takes place. Consequently it requires six times as long for gravity to increase the power as would be required if an open flume and vertical penstock were used. Special governing gates were designed and attached to the draft tubes of the wheels. These consist of a cone and sleeve, and are operated by iron rods connected with a gate regulator. This regulator is of the special compound type, having two gate motions, one for ordinary changes of load and a faster motion for heavy changes of load. This experiment was a success to the extent that the wheels are being safely and automatically governed.

During the past summer, W. D. Dickinson, superintendent of the Great Falls, Mont., Street Railway, decided to apply this system to the horizontal Victor turbine driving their generators. This wheel is $22\frac{1}{2}$ inches in diameter, working under a 40-foot head, and is supplied by a flume 400 feet long, which, so far as the flume is concerned, is a worse condition than that encountered at Ithaca. In the plant referred to the relation of the horizontal distance as to height of head is $6\frac{1}{2}$ to 1, while the corresponding ratio of the Great Falls plant is 10 to 1. Owing to the inclined position of the draft tube, it was necessary to use a butterfly gate. This gate is operated by a lever attached to its axis, with which the regulator is connected by a cable. The gate is opened by the regulator, which is of the special compound type, and is closed by gravity.

The system has recently been applied to a pair of Jas. Leffel & Co.'s horizontal samson wheels, which operate the electric railway in Burlington, Vt. These wheels are 30 inches in diameter, and work under a 31-foot head. This, also, is a closed flume. It is in the shape of a right angle, the horizontal portion being about the same length as the vertical. The draft tubes being vertical, the cone and sleeve governing gates are used. They are operated by a special compound regulator.

The Home Electric Light and Power Company, Elkhart, Ind., are equipping two John B. McCormick wheels

with the same form of governing gates. These will be operated by the special compound regulator.

The Carroll Electric Company, Matteawan, N. Y., at present constructing a power plant, will use a horizontal pair of turbines of the Rodney-Hunt pattern, and will govern them by the same system.

While a fair degree of success has been attained by the application of this system to plants built according to current ideas, it is apparent that the fullest success can be obtained only with the co-operation of constructing engineers and water-wheel builders.

The experience of the past two years has led the writer to the following conclusions:

Electric railways can be economically and successfully operated by water power, by governing the water or power supply, but in extreme changes of load the voltage will vary more than when steam power is used.

Much better results could be obtained if water wheels were built with a special view to being governed. The relation of the principles of power getting should be changed by a reform in the construction of turbines.

Closed trunks or flumes should be avoided in the construction of power plants. If they cannot be entirely avoided very large stand pipes should be erected directly over the wheels.

To develop a water power economically the wheels and generators must be built for the power site. By so doing the construction can be so simplified that the original cost of development will be materially lessened.

In order to obtain the best results in government the units of power should be as large as the conditions will permit.

Power plants, already built, can usually be adapted to electric railways by the use of the above system; but in cases where it cannot be used a station resistance can be employed that is capable of carrying the full load of power, which can be switched in or out automatically as the load varies on the line. In the last named method the maximum power is uniformly developed, the surplus being converted into heat when the load is lessened.

STERLING-SPALDING.

W. C. Sterling, Jr., Monroe, Mich., was never so happy during a holiday season, for he has received the best of Christmas and New Year gifts, a wife. The bride was Miss Emma L. Spalding, daughter of George Spalding, banker of Monroe, and congressman elect. The groom is son of W. C. Sterling, of W. C. Sterling Son, & extensive dealers in cedar poles.

INSULL-VAN VLIET.

Martin John Insull, of Sargent & Lundy, engineers, Chicago, was married recently to Virginia, daughter of John R. Van Vliet, at East Orange, N. J. After the honeymoon the pair will make their home at Evanston, a suburb of Chicago.

SKATING RINKS AS REVENUE PRODUCERS.

PART I.

Winter receipts of street railways in a latitude where there is winter, may be increased and travel stimulated in a manner that is almost as powerful as the summer resort. Of course local conditions must govern the manager in his decision as to whether he will build a skating rink, and if he determines to do so it should be placed at the terminal of the line that is away from the section that naturally supplies plenty of passengers.

The rink need not cost much money. It is not even necessary to build a skating house. A field sufficiently large to give room to move around; if flooded with water to a depth of four or six inches, and banked at sides and ends, will furnish the ice, if there is frost. An old car with a stove, will do for a skating house. Attendance need not cost much. A few laborers can be sent out in the morning to clean the snow that has been accumulated from the cutting of the skates into the ice, which ought to be flooded occasionally in order to keep a smooth surface. The flooding may be done late at night, after the skaters have gone home. The advantage of having shallow water is that it will freeze more quickly than deep water, assuring good skating, nearly all the time, so that the "skating at———" sign may be constantly displayed.

If there happens to be a public rink in the town, the street railway company may be able to keep the people by having a more attractive place. If it is larger, that is a point in its favor, while the chief advantages would be better ice and less expense. Occasionally it might be well to employ fancy skaters to give an exhibition, and if well advertised they would be sure to draw a crowd.

Some street railway companies utilize ground in the neighborhood of their power houses, which is flooded, and the ice kept in condition at slight expense. Tickets are supplied conductors, who give them to passengers desiring them, on payment of an extra fare. Admission to the pond to those who are not passengers is more expensive. While it is not expected to make the admission fee pay much of the expense of running the pond, it is considered good business to create the impression that the street railway company is catering to the interests of its passengers by giving them the benefit of an apparent reduction. For the manager must not lose sight of the fact that the important feature of the enterprise is the increase of traffic.

In order to secure attendance at night, it is only necessary to string wires for the operation of a few arc lights. There need not be many for the patrons who come at night, will bless the management, if the greater part of the pond is left in darkness. They will be perfectly satisfied, if there is no light, except at the place, where the skates are put on and removed.

Cities like Chicago, St. Louis, Minneapolis and St. Paul, have skating facilities which are supplied and kept

up by those who maintain the public parks. The street railway lines only carry the skaters. That there is great interest in the sport is shown by these figures from St. Louis:

Edwards Whitaker, president of the Lindell Railway Company, said, concerning the number of skaters at Forest Park on New Year's Day. "We carried about 60,000 to 65,000 persons on all our lines. This means that about 40,000 persons rode on the Forest Park branch of our railroad. Of course it is difficult to say just how many got off before they got to Forest Park, but I think almost 20,000 rode out on our line. Counting this, together with the people that went out on other lines, I should say that from 25,000 to 35,000 people visited Forest Park on New Year's Day." In the other large cities the crowds were similar, if it was cold enough.

Companies that maintain summer resorts can utilize the lakes for skating rinks. They may have to build more expensive houses to accommodate the patrons, but the cost will not amount to anything, when compared with the revenue it will bring in. Managers who have tried the skating rink plan, are enthusiastic in its praise. Descriptions and scenes of skating ponds operated by street railway companies will be published in the STREET RAILWAY REVIEW in subsequent issues. Managers are requested to send us photographs and details of operating, including cost of maintenance and buildings.

MAIL SERVICE AT CLEVELAND, O.

The spread of the street car mail-carrying idea over the country, is very rapid. No sooner had Brooklyn adopted the idea than Pittsburg took it up, and now Cleveland falls into line. Other cities are looking with jealous eyes upon the favored few. With these, the adoption of the mail car is only a question of time.

Contracts have been made by the Cleveland Electric Railway Company, and the postoffice department, for the transportation of the mails from the general office in Cleveland, O., to eight sub-stations. The Cleveland City Railroad Company has also been asked to enter into a similar contract, to carry mails to three additional stations. Postmaster Anderson even contemplates extending the service to Glenwood and Nottingham on the east, and Lakewood and Rocky River on the west.

The East Cleveland and Euclid postoffices, which now receive their mail over the Lake Shore & Michigan Southern Railroad, will have it delivered at their very doors by the electric car, doing away with the messenger now employed to carry between railroad and office.

E. H. Davies, of the Lycoming Improvement Company, has formally taken charge of the Vallamont Traction Company's system, Williamsport, Pa. The system includes the Williamsport Railway, Lycoming Electric Railway, East End Passenger Railway and the Vallamont Traction Company. The South Side Railway will also be operated when completed.

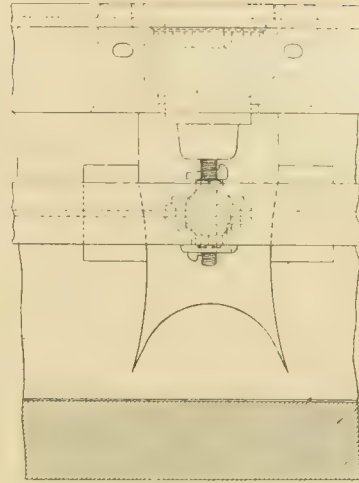
CONDUIT OF THE METROPOLITAN RAILROAD COMPANY AT WASHINGTON.

This seems to be a period of conduit building by large companies. The work on the Lenox avenue conduit of the Metropolitan Traction Company, New York, had scarcely been begun when the Metropolitan Railroad Company of Washington, D. C., decided on plans for a conduit road which will be put on eight miles of that system early in the spring. The Ninth street line will be first equipped, and if it is successful the F street line will be equipped the following year. This will make thirteen miles more, or twenty-one miles in all. The Metropolitan Railroad will be the first to go into conduit building on anything but a small experimental scale. It will be remembered that this was the road that, a few years ago, carried on such extensive experiments with storage battery traction in an unsuccessful effort to find something cheaper than horse traction and less expensive than the cable in a city where overhead wires are prohibited.



A. N. CONNETT.

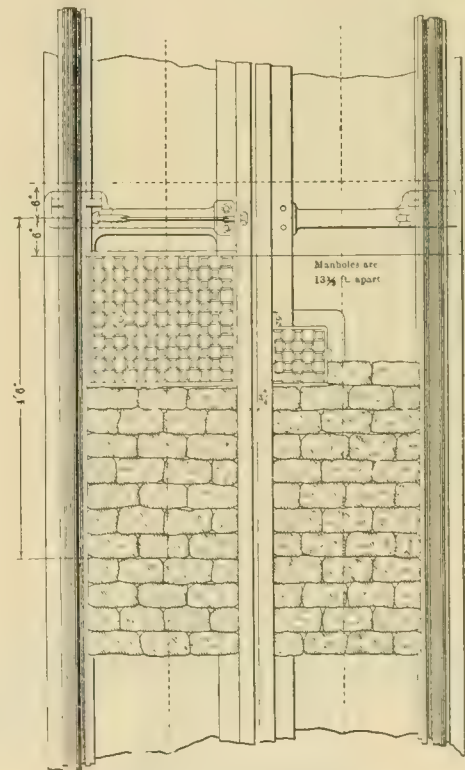
The conduit which is here illustrated is the design of A. N. Connett, the chief engineer of the Metropolitan Railroad. The construction is similar to that of a cable conduit. The insulators are of porcelain and the conductors are hung from the roof of the conduit. In case porcelain is found not to serve the purpose well, the construction is such that there will be little trouble and expense to change it. This failure is, of course, not anticipated, but it was thought best to provide for the contingency. At each insulator a regular manhole is placed, so that the insulation can be got at without taking out the



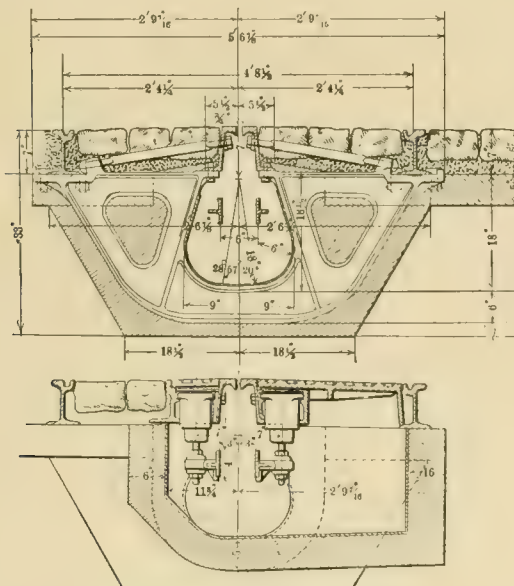
INSULATOR.

metallic circuit is used, neither side being grounded. The feed wires will be carried in terra cotta ducts and tapped in at proper intervals to the steel conductors. The road will be sectioned. The new power plant will have three 400-horse-power cross compound Providence engines, direct connected to 300-kilowatt general elec-

pavement. The manholes are to be 13½ feet apart. The contact will be a sliding one, along the vertical faces of the steel conductor. The contact device will be slung under the truck, in the same way as the grip on a cable road. This will be an effective way of reducing the oscillation that would take place if it was attached to the car body. A complete



TRACK AND MANHOLES.



SECTIONS AT YOKE AND MANHOLE.

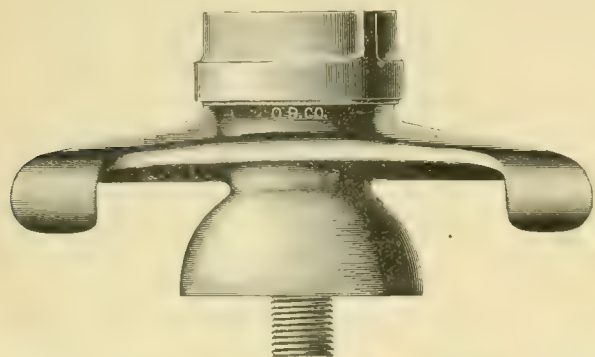
tric generators. The speed will be reduced 10 per cent below normal, so as to give a pressure of from 450 to 500 volts. If experience demonstrates that the voltage can be safely increased to 500 and 550 volts, this will be done. The F street line, to be equipped next year, will be partly operated by the station that the company has already built for storage battery purposes. This station was already equipped with engines and boilers, and the saving in lead-covered feed-wire is so great

that the extra expense of running two stations is warranted. The cars will be operated in trains, a motor-car pulling a trailer. The motor-car will be open. There will be a center aisle, and a running board on each side. A partition, in front of the car, will be open in summer and closed in winter, so as to make the car more comfortable in stormy and cold weather than the ordinary grip cars. The rolling-stock is to be of the very highest character.

A. N. Connett, the chief engineer, is a man who has had abundant experience in both cable and electric conduit work. His street railway experience began with work on some of the Kansas City cable lines, in 1888. Later in that year he joined the engineering corps of the Bentley-Knight Company, and was engaged in installing the electric conduits of that company at Allegheny, Boston and New York. Fully convinced of the unsuccessful character of these undertakings, he returned to cable construction work, and was appointed to assist Daniel Bon-tecon on the Seventh street line, at Washington, and remained until its completion. He then was, for a short time, connected with the Broadway cable, and, July 1, 1891, became chief engineer of the Baltimore City Passenger Railway. He was there three years, being general manager the last year. Under him twenty-two miles of cable and twenty-three miles of electric road were built. Last September he was appointed chief engineer of the Metropolitan Railroad, being anxious to try the conduit system where it had a good chance of success. The favorable climate, together with the liberal policy of the railroad company, make success seem to him to be reasonably well assured, and we join in hoping to see his expectations realized.

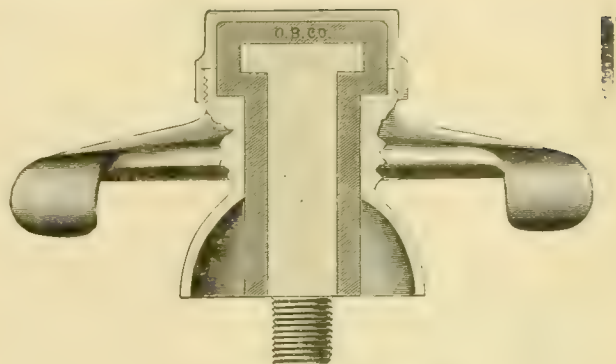
NEW TYPE OF TROLLEY HANGER.

Trolley hangers fill an important place in overhead material, and there are many excellent styles on the market which give satisfaction, but there is always some-



TYPE K STRAIGHT LINE TROLLEY HANGER

thing new being brought out. The views show an elevation and cross section of the type K straight line trolley hanger of the Ohio Brass Company, Mansfield, O., which is made in all the various styles necessary to support the trolley wire for the different suspensions in general use. In design and method of working it has



SECTION OF INSULATED BOLT

some resemblance to the West End type. It is claimed that the details of construction and proportion of metal insulating parts have been changed, and give increased electrical and mechanical strength with decreased weight.

The hanger is made in three parts, body, cap and insulated bolt $\frac{5}{8}$ of an inch in diameter, of drop forged steel, molded with a heavy covering of insulating material around it, being thoroughly protected from moisture and accidental blows by the metal covering surrounding it. The cap screws into the hanger body, bearing directly on a leather washer interposed between it and the head of the insulated bolt, which is said to be thus held securely in position. A peculiar feature of the type K hanger is the cap and threaded lip of the hanger body, which makes it possible to screw the insulated bolt into the trolley wire support without raising it from its normal position. Hanger bodies are furnished in malleable iron or bronze metal. The Ohio Brass Company reports supplying these hangers to roads in Chicago, Dayton, Terre Haute, and other cities.

GOSSIP ABOUT PRESIDENTS AND MANAGERS.

President Nelson Perin, of the City & Suburban Railway Company, Baltimore, Md., has returned home from a European trip, which afforded him a good rest and enjoyable change.

F. D. Hoskins, of the Hoskins Traction Company, San Francisco, Cal., was in Chicago recently and made the REVIEW a pleasant call.

A. E. Lang, president of the Consolidated Street Railway Company, Toledo, O., favored the REVIEW with a pleasant call.

E. L. Coolyhan has resigned the superintendency of the Montgomery, Ala., Street Railway and returned to his old home in Baltimore. When Mr. Coolyhan took charge of the road four years ago it was a small mule line. Under his administration and owing to his efforts it has become an electric line.

Henry M. Doremus, of Newark, has been made vice-president of the Bridgeport, Conn., Traction Company, in place of Elias S. Ward, who resigned.

Thomas Lowry, president of the Twin City Rapid Transit Company, has returned to Minneapolis in the best of health, after a pleasant tour in Europe.

THE THREE-WIRE SYSTEM AT ST. LOUIS.

A Third Road Tries the Three-Wire System—Satisfactory Results Obtained.

For three years the three-wire system has been used by the Union Power Company, of Portland, Oregon, for supplying current to the street railway systems of that city. At Bangor, Me., it has also been used three years. Although these roads have been operating with success on the three-wire plan for so long a time, the matter has attracted little attention until recently, when interest was revived by the publication in the *REVIEW* of articles by A. C. Balch, of the Union Power Company, Portland, in the April, 1894, issue, and J. G. Carroll, of Bangor, in the August, 1894, issue, describing the successful operation of this plan. In October, about the time of the Atlanta street railway convention, the General Electric Company began to push this system. Meanwhile, experiments were being begun at St. Louis, under very unfavorable conditions, and as these have now terminated successfully, an extended description of the work done there will be of special interest at the present time, when so many street railway men are watching the three-wire system, with a view to its possible adoption.

As no less than two prominent street railway men

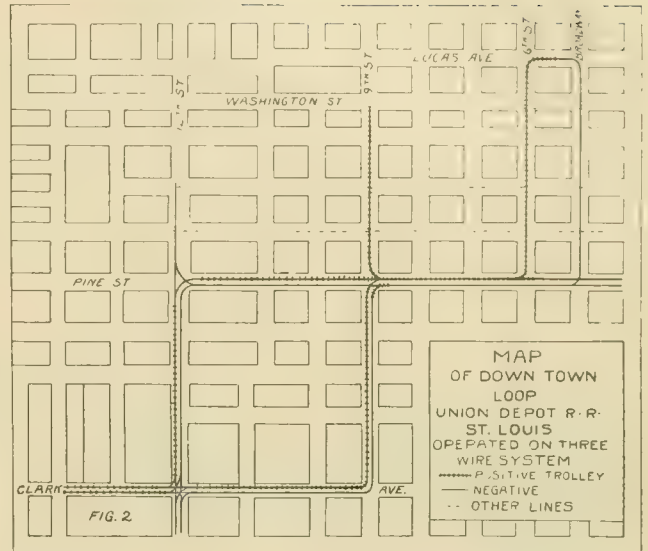


FIGURE 2.

positive and negative sections. The system is then "in balance." In Figure 1, two generators are pulling two cars. The current goes out through the positive feeder and trolley, through the car to the ground, along the track to the car on the other section, and through that car back to the power house, and to the generators. If the car on one section is stopped, the system is out of balance, and the current from the other returns to the power house through the rails and ground, as in the ordinary two-wire system. However, on a large road, with a large number of cars, the balance between the two sides can be kept, so that very little returns through the ground. Aside from preventing electrolysis, the system has the advantage of a saving in copper, as it is practically a 1,000-volt system, and the amount of copper required varies inversely as the square of the voltage. Hence, theoretically, only one-fourth as much copper is necessary to transmit a given power with a given loss, as with the 500-volt system. This, however, is modified by some practical considerations, and the matter of the actual saving accomplished will be discussed later. The three-wire system is not a new thing. It has been used for years by all the large direct current incandescent lighting stations. Its economy is unquestioned. The only difficulties in applying it to railway work are the maintenance of the balance between the positive and negative

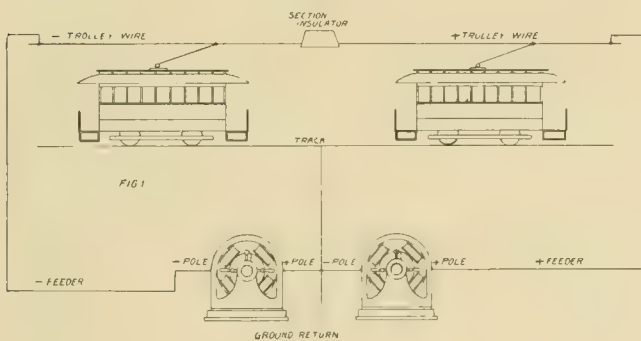
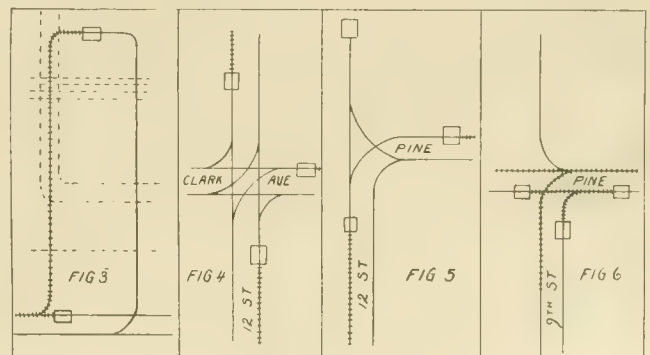


FIGURE 1.

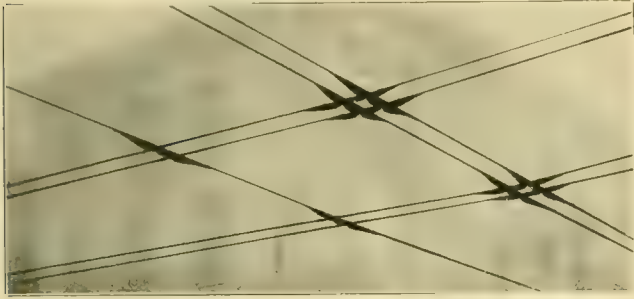
have asked the writer "where the third wire comes in," it may be well to preface this description with a short explanation of the principles of the system. The term three-wire, does not mean that more than one trolley wire is used. It refers simply to the manner of connecting the generators to the trolley feeders. Not even an expert could tell whether a road was being operated on the three-wire plan, by simply looking at the overhead lines. The connections for the three-wire system are made as shown in Figure 1. The trolley wire is divided into sections. The positive poles of half the generators running in the station are connected to a part of the sections, and the negative poles of the remaining generators are connected to the remaining sections. The positive poles of half the generators are connected to track and ground, and the negative poles of the other half to track and ground. This practically puts the two generators in series with one another. The trolley wire sections are so arranged that about the same number of cars are on the



FIGURES 3, 4, 5 AND 6.

sides, and the insulation between the sections, which must be strong enough to withstand the 1,000 volts pressure.

The experiment at St. Louis was tried on a portion of the lines of the Union Depot Railroad. The work has been under the charge of W. C. Gotshall, the well-known electric railway expert, formerly of Chicago. To him is due the credit of working out the technical details and pushing to success a plan which met with much opposition on the part of local experts. He has proved the soundness of his judgment in advocating the system.



OVERHEAD CROSSINGS, THREE-WIRE SYSTEM, ST. LOUIS.

John Scullin, president, and Harry Scullin, general manager of the Union Depot Railroad also deserve the thanks of the other street railway men of the country for giving the system a trial in spite of the assurances they received from certain electricians that it would burn out the entire station and bankrupt the company.

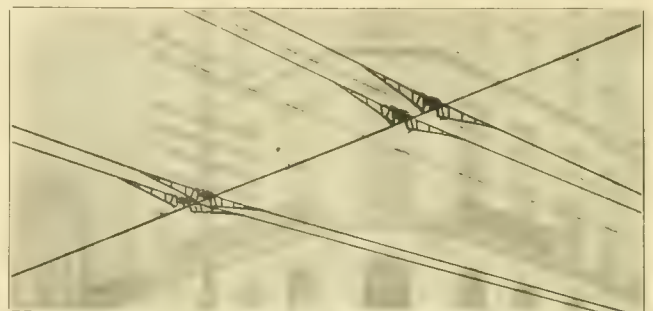
The portion of the road selected on which to try the experiment was the down town loop comprising five miles of single track. This is the part on which there is the heaviest traffic and on account of its many curves and crossings is the most difficult to successfully operate on the three-wire plan. It was admitted beforehand that if the loop could be operated in this way there would be no difficulty on the rest of the system. Another reason for making the change on this part of the road was that there was a heavy drop in voltage on that portion.

Figure 2 shows the lines now operated on the three-wire plan. The plain lines are the negative trolley wire sections, the crossed lines are the positive trolley wire sections, and the dotted lines are the lines of other roads which are, of course, positive. It will be seen that in general the policy has been pursued of making the wire over one track positive and the other negative. At the branch off curves either the positive or negative wire is insulated by section insulators from the curve, so that the entire special overhead work at a curve is either positive or negative. After the curve is passed another section insulator is put in and the different polarity of wires resumed. This is well illustrated by Figure 6, which shows in detail the work at Ninth and Pine streets. Figure 4 shows another piece of special work at Clark avenue and Twelfth street, and Figure 5 one at Pine and Twelfth. Figure 3 is the most interesting of all, however, as it shows thirteen overhead crossings with other roads. Of these, seven are on the negative wire, so that

there is 1,000 volts difference between the wires. On Washington street the trolley wires of two other companies are run, paralleling each other, and about a foot apart. They cross the negative trolley at Broadway.

Preparations were begun for the change about September 1, 1894, and the three-wire system was first put in operation about October 1. Owing to changes that were being made in the station, the three-wire system could not be operated continuously until about seven weeks ago. Since then, according to Mr. Gotshall, the three-wire system has been in continuous operation, and there has been only one emergency call on the three-wire portion. This was caused by the breaking of a crossing by a trolley pole which flew off. The three-wire system has not caused the shutting down of any portion of the road, even during the experimental period, because in case of a short circuit between positive and negative sections, it is only necessary to throw a switch at the station and resume operation on the two-wire plan until the defect can be fixed. The section is being operated now with eight 62-kilowatt Thomson-Houston generators—four on each side. The only expense for material in the station in making the change was the cost of two single pole switches and 500 feet of 0000 feeder wire. The practical advantage gained has been a great improvement in the voltage at the down town loop, which is two miles from the power station. The speed was formerly slow and the light bad, but there is now evidence of very little drop in potential.

In the course of experiments it did not take Mr. Gotshall long to find out that the ordinary forms of section insulator and crossing will not withstand 1,000 volts in all kinds of weather and accordingly slight modifications were devised which served the purpose well. The form of section insulator adopted, is simply a slab of hard fibre with ten inches between contacts instead of the usual five inches. For crossings, the ordinary swivel crossing in which the wire on the dead side runs in a groove



OVERHEAD CROSSINGS, THREE-WIRE SYSTEM, ST. LOUIS.

along the top of the hard fibre is modified by putting a wedge of hard fibre in the opening over the center bolt. A cap is also put over the wire after it is put in the groove so that it is enclosed in a water-tight case the length of the crossing. Before the wedge was put over the bolt head dirt or moisture would sometimes strike an arc across the $\frac{3}{4}$ -inch air space between wire

and bolt head and a burned out crossing would result. The crossings have ten inches of hard fibre between metal contacts.

Another important point is the method of tapping in from feed wire to trolley wire. It often happens that the positive feed wire will be on the opposite side of the street from the positive trolley wire. It is therefore

to put any generator on either side and to do this it is only necessary to put a double throw three pole switch in place of the usual single throw three pole generator switch. Throwing the switch one way would connect the positive pole of the generator to the positive trolley bus bar and the negative pole to the grounded bus as in usual practice. Throwing it the other way would con-



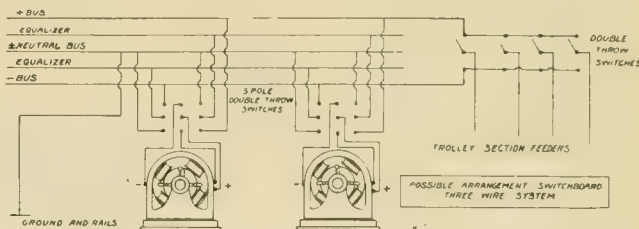
CROSSINGS USED WITH THREE-WIRE SYSTEM—ST. LOUIS.

necessary to keep the tapping in wire thoroughly clear of the trolley wire of opposite potential which it crosses. This was finally successfully accomplished by making the trolley clip with a special piece into which the wire could be soldered and run directly across to the feed wire on the pole. Making the span wire a feed tap and trying to insulate one of the trolley wires from it was found to be impracticable because there must then be 1,000 volts between the trolley and span wire.

Aside from the problem of insulation, which has been successfully solved in the manner described, the maintenance of the balance is the principal question. This is a matter that can not be decided in a general way to cover all cases. There are two methods of dividing a line to maintain a balance. One is to make one track positive and the other negative. This will keep the balance as long as the cars are not bunched and the traffic is not too much on one side. The other method is to divide the line up into short sections and make alternate sections positive and negative. This will keep the balance better under all circumstances but it is not desirable to cut up the line so much. A combination of these

two methods, with plenty of common sense and judgment will give the best results. The arrangement of the switchboard with the three-wire system may be such as to permit any arrangement of feeders or generators. It

nect the positive pole of the generator to the grounded bus and the negative to the negative trolley bus. At the feeder board each feeder or group of feeders supplying a section should have a double throw single pole switch in place of the single throw single pole switch now used, so that a section can be thrown either on the positive or negative side. This is important for two reasons. In the first place it obviates shutting down a section when the insulation between sections or at crossings breaks down. When this occurs the section can be thrown in on the other side until the insulation is repaired. In the second place it is easier to maintain a balance when the sections can be thrown on either side. In case it is found that the balance is not good it is only a matter of



a few seconds to restore it by changing the polarity of some of the sections. Thus the traffic will be heaviest on the ingoing tracks in the morning and outgoing tracks in the evening. This can all be provided for by the double throw feeder switches. Main ammeters should be put in both the positive and negative bus bars so that the balance can be determined at a glance.

The principal objection now raised against the three-wire system is that it always requires the operation of at least two generators, and where, as in the most recent modern practice, there are only a few generators in a power station, it is not easy to proportion the generator capacity to the load to be taken care of. There is some weight to this objection, but on very light loads, as for running owl cars during the night, the sections can all be switched onto one side of the circuit, and one small gen-

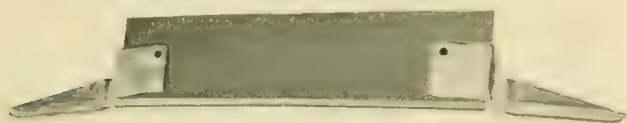


TAPPING IN HANGER.

should be possible to put any generator on either side of the circuit. Otherwise it is necessary to set aside half of the generators to permanently operate one side and half on the other side. In case of an unusual number of breakdowns on one side the service would be seriously impaired as it would not be possible to bring all the idle generators into service. Therefore it should be possible

erator can operate the road on the two-wire system. The fall of voltage would not be much with a light traffic. Hence the above objection would not have as much weight as would at first appear.

Now as to the saving in copper. The installation of the three-wire system on a road already installed has the practical effect of eliminating the drop of potential, and consequent loss of energy in the ground return. This is on the supposition that the same amount of copper is used for trolley feeders as was used with the two-wire system. There are several ways of arriving mathematically at this result. Perhaps the most simple conception of it is as follows: When the two-wire is changed to a three-wire system, it takes only one-half the former current to move a given number of cars, owing to the doubled voltage. At the same time the feed wire is



10-INCH SECTION INSULATOR.

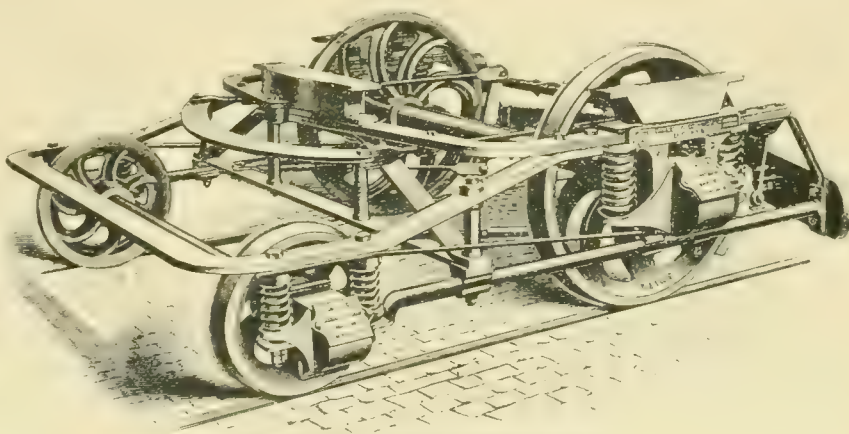
divided between the two sides of the circuit, so that there is only half the cross section of copper to carry the current, hence the loss in the trolley feeders will be exactly the same as before, but as the overhead lines are carrying all the current, there is no loss in the ground return.

Certain engineers now advocate putting as much copper in the return as in the trolley feeders. On this theory only about one-third as much copper is needed to wire a road for a given loss as with the two-wire system. The amount of copper required to transmit a certain amount of energy a given distance at a given loss varies inversely as the square of the voltage, hence one-fourth the copper is necessary on a 1,000-volt system that would be necessary with 500 volts. However, the neutral or ground circuit must have a sufficient capacity to carry some current when the system is not in balance, and hence the amount of copper will be brought up to about one-third that necessary on the two-wire plan. This, it must be remembered, is on the assumption that a road is going to put as much copper in its return as in its trolley feeders—a condition of affairs that hardly ever exists. In average practical every day electric railway work the three-wire system simply saves the loss in the ground return, whatever that loss is, and enables a road to operate economically without putting as much money in a ground return as would otherwise be necessary. The ground return, however, can not be entirely neglected with this system, as the track is the neutral wire and must carry considerable current for short distances from the cars on positive sections to the cars on negative sections.

THE BARNEY & SMITH BICYCLE TRUCK.

The type of truck shown herewith has been successfully run, under not very favorable conditions, for an entire season, requiring no repairs. The track over which it was run was low, with badly worn frogs and switch points, and curves with a radius as short as thirty feet, yet the truck never left the track. The truck is designed for long interurban cars, where the distance from the rail to the bottom of the car body is not more than twenty-eight to thirty inches, and where it is desirable for most of the weight of the car body to bear directly upon the driving wheels, in order to give the greatest amount of traction. As there are only two motors, not more than one pair of wheels under each truck will act as driving wheels. It can be supplied with driving wheels from thirty-three to thirty-six inches in diameter and even larger, for large driving wheels do less slipping than small ones, and enable the car to attain greater speed.

The truck is built by the Barney & Smith Car Company, Dayton, O., with forged heavy frames. Pedestals, journal boxes, radial bearings, and all other castings, are malleable, and the only gray iron employed is in the brake shoes. The radial bearings have a rack surface, and engage with toothed brass rollers. On account of the action being positive, it prevents them from becoming flat and inactive. When on a curve an extra amount of weight is thrown on the trail wheel whose flange is crowding the rail, on account of the position of the rollers, which lessens the liability of derailment. Only enough weight is placed on trail wheels to keep them in contact with the rails, while most of the weight of the car body, motor and truck is utilized for traction. The



THE BARNEY & SMITH BICYCLE TRUCK.

motor is indirectly suspended from the car body, not affecting the trail wheels by its weight or rotative pressure. The car body carried on the bicycle truck is twenty-eight inches above the rail, the least distance the motor will permit.

The office of the New England agency of the Westinghouse Electric & Manufacturing Company, formerly located at 620 Atlantic avenue, has been removed to the Exchange building, 53 State street, Boston.

ANNUAL REPORTS OF THE YERKES LINES, CHICAGO.

The reports of Chicago's great systems are always interesting, as showing what can be done by carrying on a business on a large scale. It must, however, be remembered that wages in Chicago are very high. The West Chicago Street Railroad makes the following showing:

Trips made,	- - -	1,912,420
Miles run,	- - -	15,671,500
Passengers carried,	- - -	85,287,302
Receipts per car mile by horse cars,	-	23.20 cts.
Receipts per car mile by cable cars,	-	30.07 cts.
Expense per horse car mile,	- -	18.38 cts.
Expense per cable car mile,	- -	13.46 cts.
Passengers carried by horses,	- -	40,106,059
Passengers carried by cable,	- -	45,181,243
Average number miles per horse per day,	-	12.19

The North Chicago Street Railroad makes its report in a slightly different form, as follows:

Total number of passengers,	- -	49,571,463
Miles traveled,	- - -	8,793,587
Average daily receipts,	- -	\$6,794.01
Average daily operating expenses,	- -	\$3,691.30
Average daily trips,	- - -	3,864
Average daily miles,	- - -	24,091
Cable expenses per car mile	- -	13.02 cts.
Horse car expenses per car mile	- -	18.99 cts.

SALT AND BRICK PAVING.

Does salt injure brick paving?

Mayor Brown, of Newport, Ky., says that it does, and he is backed by the machinery of the city in his opinion. The street railway company holds a contrary opinion, yet it is hindered in the operation of its line by the enforcement of the ordinance against distributing salt on the tracks.

This is an entirely new problem in street paving. It does not seem as if salt would injure brick, but no tests have been made to prove it either way. In fact no one has ever given it any thought. Salt has the reputation of being a preservative, rather than a destroyer. Good paving brick should not absorb more than two per cent of moisture. In fact, they are supposed to stand a test before being accepted, and it is difficult to see how a brick which has absorbed all the moisture it can hold, can take in any salt.

D. V. Purington, Chicago, who is an authority on brick of all kinds and especially of brick for paving purposes says it never occurred to him to test the action of salt on brick. He doubts if it can injure brick, even if the quality be such that it will absorb more than two per cent of moisture. When he had said this, Mr. Purington picked a sample of his brick from his desk and looked at it. "I am prepared to stake my reputation on the statement that my brick will not be injured by salt,"

he said. "I will at once begin tests, however, to see just what the effect of salt is on all kinds of brick."

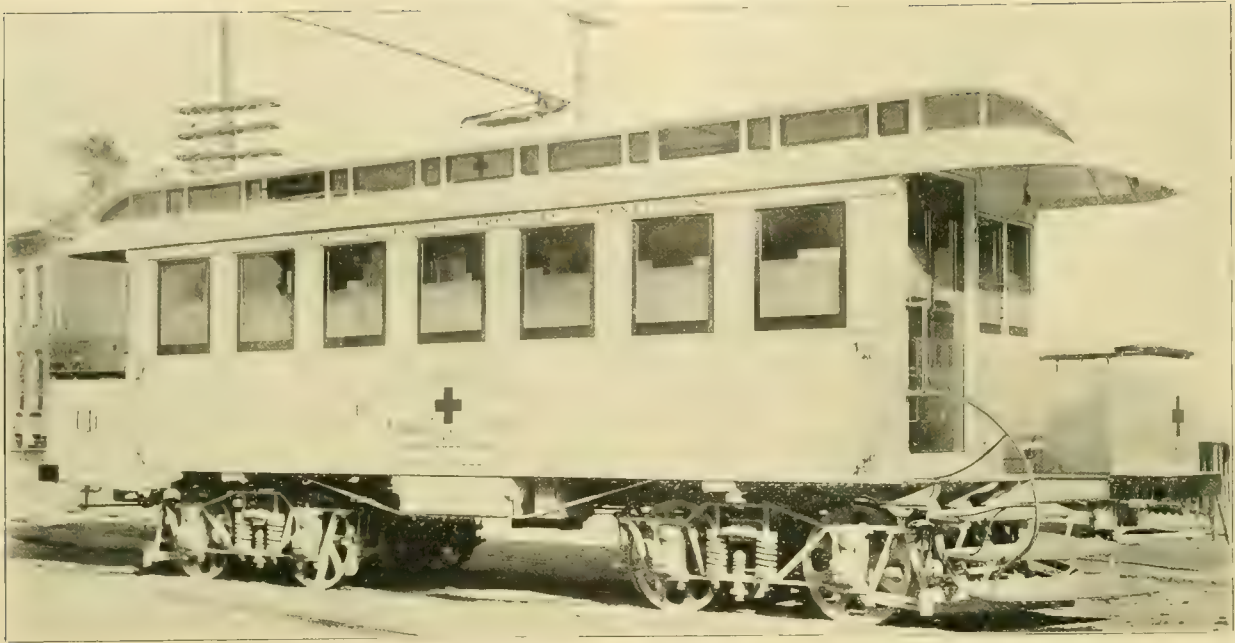
Mr. Purington has submitted an analysis of Galesburg shale, of which the Purington Paving Brick Company's brick is made, to Hill & Enricht. The following was received by him, which ought to settle the controversy: "Your communication containing analysis of the Galesburg clay or shale received. Referring to your inquiry as to the effect chemically of salt (Na Cl) on a vitrified brick made from such shale, we would say we find no properties in said analysis, which, when vitrified into brick form, could be attacked by the chlorine contained in salt." Mr. Purington offers to furnish the mayor of Newport with samples of his company's brick and will guarantee that he cannot injure them with salt, no matter how much he uses nor how he applies it.

NEW POWER HOUSE STARTED AT CHICAGO.

The immense power house which is to furnish current for the lines in northwest Chicago has been started, and is now operating three lines, although it is far from finished, and only one generator is completed. The power house is nominally owned by the Chicago Electric Transit Company, which is, however, an organization in harmony with the West and North Chicago Street Railroad Companies, and is controlled by the Yerkes syndicate. The plant is to be of an ultimate capacity of 8,000 horsepower and is one of the finest in the world. Its details will be placed before our readers in due time.

The first line in operation has $5\frac{1}{2}$ miles of double track, running from the intersection of Milwaukee and Elston avenues, north and northwest on the latter to Montrose. This line will be extended in the spring. The second line in operation is the Milwaukee avenue line, which, starting from the terminus of the Milwaukee avenue cable line, of the West Chicago Street Railroad, has five miles of double track, running to the village of Jefferson. The third line, known as the Lincoln avenue line, is a duplicate of the Milwaukee avenue line, and runs from the terminus of the Lincoln avenue cable line, of the North Chicago Street Railroad, to Bowmanville. All the rails are 85-pound girder, and the special work was made by the Johnson Company, Johnstown, Pa.

Fifteen single truck Brownell accelerator cars are in use on each line. They are equipped with G. E. 800 motors and K controllers, six American Electric Company heaters, connected series multiple and Meaker stationary fare registers. The line appliances are those of the New York Electrical Works, and the line material and cable wires were furnished by the American Feeder Works, New York. The American Railway Construction Company did the track work. Work was begun in August, under the direction of C. E. Collins, general superintendent of the company, who began street railway work with Sprague, and has been connected with the Edison Company and General Electric Company in the southern district. Mr.



ST. LOUIS AMBULANCE CAR.

Collins will have his office at the Elston avenue car barn, which is about four miles from the city end of the line. The building is 315 by 92 feet, two stories, with capacity for eighty cars. The floor and pits are of concrete, the latter draining into the sewer in the street. The building is heated by steam. An electric elevator will be put in to carry cars to the second story. The officers of the company are D. H. Louderback, president; J. R. Chapman, general manager; C. E. Collins, superintendent.

ELECTRIC STREET CAR AMBULANCE.

Planned by Dr. George Homan, Health Commissioner—Now in Operation in St. Louis.

After many years of hard work endeavoring to obtain favorable legislation, but unable to secure it, Dr. George Homan, health commissioner of St. Louis, has at last secured an ambulance car through another source. Dr. Homan has long felt the need of a car for transferring persons to the hospital, but has met with many discouragements in his efforts to bring it into practical operation. A short time ago President Scullin, of the Union Depot Street Railroad Company, became interested, and ordered a car to be built by the St. Louis Car Company after plans of Dr. Homan. In order to settle by a practical test the details of interior construction and finishing, an ordinary car was fitted up and run for a month while the other was being built. It is now believed that a perfect car has been secured.

The car is thirty-three feet long, including the platforms, the inside measurement being 24 feet by 7 feet 2 inches wide in clear. The platforms are built so that they occupy only one-half of the width of the car body, thus allowing very broad steps, which are placed on the right-hand side immediately in front of the door. There

are four steps, which are fastened with hinges so constructed that they may be swung back when not in use, preventing children from riding on the car. The platform is only wide enough to furnish room for the electric apparatus and the motorman, and on the side by the steps is a brass hand rail to support invalids while mounting and dismounting from the car.

The doorways are three feet two inches in width in clear, the doors sliding on rollers placed at the top, and guided in metal guides at bottom, the guides being so constructed that no cold and dust can penetrate beneath the door. The general design of car is steam-coach style, paneled the same as steam coach, and the roof is constructed the same as steam coach roof. There is also a ventilator the full length of the car, which is a double-ender, and can be operated from either end.

There are seven sash on each side 2 feet 4 inches wide that can be lowered if desired. The lower half of the side lights is frosted so as to make them non-transparent. The doors are also provided with sash, and all ventilator sash are pivoted so as to give perfect ventilation to the car. The car is lighted on the inside by ten incandescent lamps, heated with electric heaters, and furnished with electric brakes. The interior of car is divided in the center by a wooden partition 5 feet 6 inches high, placed 4 inches from the floor, with two doors swinging either way in the center, one compartment being for males, the other for females. The entire partition which separates the two compartments is so constructed that it will swing out of the way entirely and rest closely against the sides of the car. A leaf or shelf is hinged to one side of the partition and can be lifted into place and secured for use by the surgeon as a desk.

Placed at the right hand of each door on entering the car is a large locker for blankets, towels, etc., while between the windows are eight small ones for medicines,

bandages and instruments. Immediately back of the large lockers in the corners are earth-closet conveniences for both sexes, the doors opening outward toward the center of the car, the top of the inclosure being finished with plain glass so as to permit light to the closet. Water coolers are placed in each end of the car. Electric call bells communicating with both platforms are placed near the center of the car for the use of the surgeon.

A small washstand is placed about the middle of the car supplied with water by a pump from a tank under the car. Provisions are made underneath the car for carrying a supply of ice, and a locker for stretchers.

The interior of car is finished in cherry, there being no spaces for dirt to accumulate. The ceiling is made of three-ply bird's-eye maple veneer, finished without any decorations, but laid off in panels, and the entire interior is finished in oil finish. The floor is double, with asbestos filling to deaden sound from the trucks and motors. The top floor is made of quartered oak and polished. All of the trimmings are solid bronze, polished. The car is mounted on two pivotal trucks. The trucks are of special construction, having two sets of springs, equalizing springs over the oil-box, in addition to the springs that carry the car body. This truck will greatly reduce the noise while crossing other tracks and make it an easy

riding car. The car is painted white, trimmed with gold and blue. The lettering on the sides reads, "St. Louis Health Department Ambulance Car," and the last two words are repeated on each dash or end of car. The Geneva cross is displayed on the sides and front to emphasize the humane purposes to which the vehicle is devoted. The running gear is painted stone color. The car is elevated about 3 feet 3 inches from the track. The car is provided with draw bars, same as ordinary cars, in case it must be towed by other cars.

The car is mounted on two pivotal trucks of special construction, having two sets of equalizing springs over the oil box, in addition to the springs that carry the car body. This truck will greatly reduce the noise while crossing intersecting tracks, and make it an easy riding car. The furnishings and equipment, supplied by the health department, under the direction of Dr. Homan, consist of eighteen plain, folding chairs, twelve having arms, and six without, all provided with rubber fenders, to prevent slipping, or defacement of woodwork. Several litters or stretchers are carried stored in a locker, and in an inclosure under the car body. They are made of woven wire and rubber duck, fitted with sliding handles, and folding supports elevating them, if need be, eighteen inches from the floor. A number of blankets, air pil-



INTERIOR ST. LOUIS AMBULANCE CAR.

lows, splints, etc., are stored in proper receptacles. A supply of necessary instruments, medicines, dressings, etc., has been provided in their appropriate places.

When in service, it is proposed to man the car with a physician, who shall be known as ambulance surgeon, who shall be held responsible for its proper management as a conveyance for the sick and injured. A male nurse, and motorman, the latter furnished by the Union Depot Railroad Company, form the crew, which is under the orders of the surgeon while on duty. The car will run on schedule, so that patients may be delivered aboard the car with little handling or delay. It is the intention to supply track facilities at the various institutions, which will enable the patients to be landed under shelter at their doors.

With simple ceremony the new ambulance car was initiated into its work. At 7:30, on the night of Dec. 27, Drs. Homan, Robinson and Forster, of the board of health; City Physician Priest; Mr. Kaufman, clerk of the board; John and Harry Scullin, of the Union Depot Railway; J. S. Minary, of the Southern Railway Company; P. M. Kling, of the St. Louis Car Company; Charles Nagel, president of the council; W. H. O'Brien, of the house of delegates; Drs. I. N. Love, Albert Merrell, L. S. Riesmeyer and J. M. Ball and M. Dougherty, boarded the car and took a short ride. They left the car at the Union Depot cafe, where a banquet had been prepared. The decorations were excellent, one piece, a fac simile of the ambulance car, in flowers, attracting much attention.

Dr. Homan presided, but appointed Dr. Love toastmaster. In his speech, Dr. Homan mentioned Dr. Albert Merrell as the originator of the idea of an ambulance car, and of John Scullin as the executor of the idea. Dr. Love paid a tribute to Dr. Homan, and President Nagel, of the council, told how Dr. Homan was chosen to his present position by the council, stating that he was selected contrary to adopted rules governing such appointments, having been chosen to fill the unexpired term of an officer who was removed by the mayor, in order that it might not be suspected that the officer was removed to make room for a partisan. He spoke of other new measures inaugurated by Dr. Homan for the benefit of the department.

John F. Flournoy, president of the Columbus Street Railway Company, Columbus, Ga., has been appointed receiver of the Georgia, Midland & Gulf Railroad, by the United States Court. The appointment is a tribute to Mr. Flournoy's great talents as an organizer, and was a surprise to him, having been unsolicited.

Col. Samuel A. Dyer, president of the Chester Traction Company, Chester, Pa., died of pleuro-pneumonia, in his 56th year. He helped organize the street railway system in 1882, and in 1888 organized the Union Street Railway Company, owing a controlling interest. During the war he served as lieutenant-colonel of the First Pennsylvania Reserves.

FENDERS CAUSE TROUBLE.

Much speculation was disturbing the people of Baltimore as to whether Governor Brown of Maryland, and president of the Baltimore Traction Company, would be placed under arrest and fined \$5 and costs for each of the cars of his company not equipped with fenders. No attempt was made, however, to place the governor under arrest, the authorities contenting themselves with issuing warrants for William A. House, general manager of the Baltimore Traction Company; J. F. Heyward, of the City & Suburban; F. L. Hart, of the City Passenger Railway Company, and L. N. Frederick, of the Lake Roland Elevated Railway Company. The street railway side of the case is thus explained by Governor Brown:

"The city council in passing the fender ordinance practically requires the railway companies to put a fender on the cars that does not exist. If the council or commission had selected one or two fenders and directed the companies to put them on the cars the companies would have done so at once, but the companies, after in vain expecting a selection to be made by the commission, were compelled to examine a large number of fenders. As we had to spend our money for such devices, we wanted to get the best we could. It is absurd to talk about compelling the companies to examine all these fenders, make a selection, get the materials, construct the fenders and put them on the cars in such a limited time. I don't blame the city council, because I don't believe the members realized the difficulties to be overcome. It must be recollected that the fenders cannot be put on the cars while they are being operated. I don't believe any court can compel the companies to pay a fine for non-compliance with the ordinance when a reasonable time is not allowed."

The various managers gave bonds and the cases were continued until the latter part of the month.

"TRAMWAYS."

The above is the title of a standard English work, by R. K. Clark, a revised and enlarged edition of which is just out. It is the most complete work of the kind ever published. It gives a history of tramway practice since its beginning, including some earlier American lines, and the English lines of to-day. Part II is a statistical and financial treatise on English tram lines. English practice in the construction of tramways, is next taken up, and also the subject of cars, trucks and wheels on English and French roads. Under mechanical power, steam, compressed air gas, cable and electricity, as applied by different inventors, are discussed at length. There is a description of all English electric roads, and chapters are devoted to the electric railway industry in Germany and America. The book is handled by A. C. McClurg & Company, Chicago, and the price is \$9.00.

CONVENIENT METHODS FOR MEASURING SMALL RESISTANCE AND INSULATION RESISTANCE WITH VOLT AND AMMETER.

BY W. C. FUCHS.

The development of the street car motor has been in a direction toward series-parallel control. This led to motors designed with small resistance, and each motor having four field coils connected in series, the resistance of one coil will be as small as .02 ohm. For measuring these small resistances the ordinary Wheatstone bridge is unsuitable, for the following reasons: It is often of a cheap make, equipped with a not over-sensitive galvanometer, and often the coils are not calibrated correctly and

varying the current to any required number of amperes. The greatest resistance necessary is four ohms.

Before the resistance of the field coils is measured the following instructions must be observed:

(1) Pull down trolley and throw canopy switch to "off" position.

(2) Remove brushes from each motor.

(3) Connect "jumper" across armature terminals of each motor.

(4) Prepare terminals of field coils to be tested.

(5) Insert adjustable resistance and ammeter across canopy switch. (See Figure 1).

(6) Throw controller handle on the point connecting the diverter with the two motors in series (if resistance of diverter is subsequently proved to be too great, throw controlling switch on the point at which the diverter is

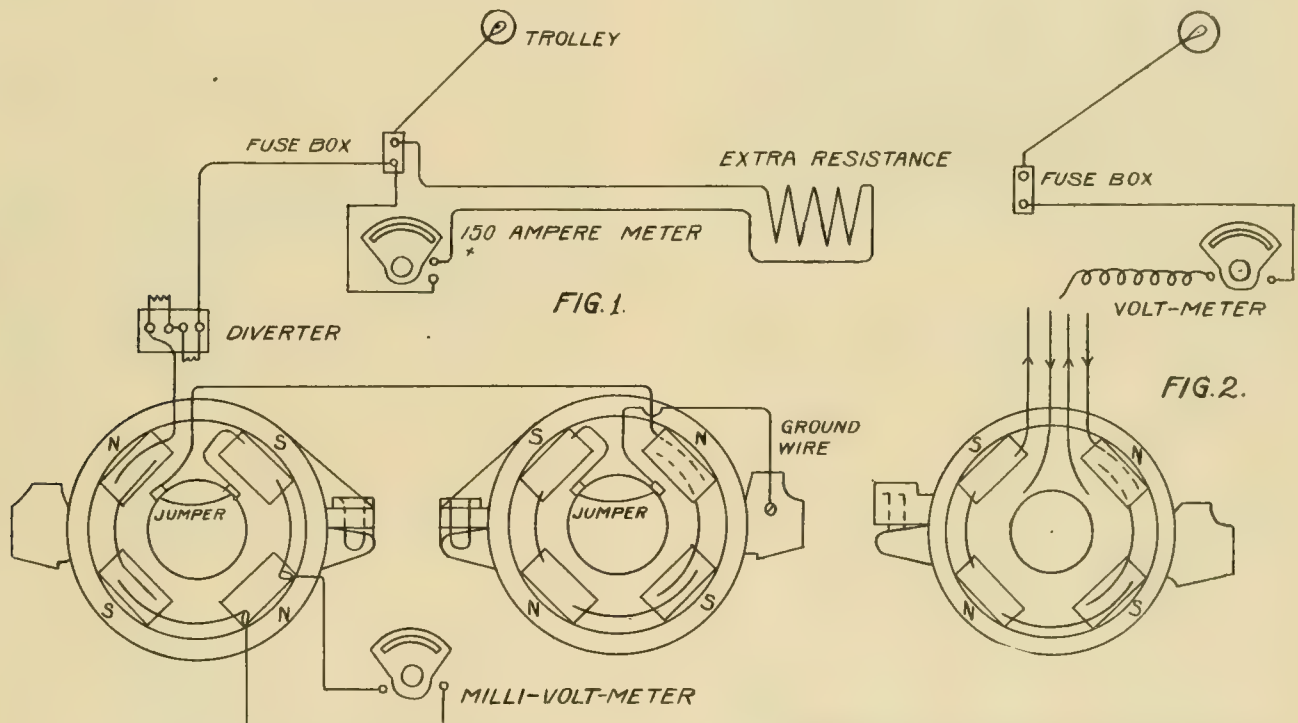


FIG. 1.—CONNECTIONS FOR RESISTANCE TEST.

FIG. 2.—CONNECTION OF VOLTMETER FOR INSULATION TEST.

the resistance of the connections due to imperfect contacts in plugs vitiates the results. I dare say all street railway plants are in possession of a correct portable ammeter with a scale reading from 0 to 150 amperes, and a volt meter with a scale reading from 0 to 600 volts. It is doubtful, however, if a millivolt meter reading from $\frac{1}{10}$ to 3 volts can be often found around such plants. If this latter is secured, however, all necessary electrical measurements and tests can be correctly accomplished with this and the volt and ammeter.

I will here only describe the methods of measuring the conductivity and insulation resistance of motors in the barn or repair shop.

To test the conductivity of a motor connections are made as in Figure 1. An extra resistance is introduced in the circuit. This resistance is made of iron wire coiled and stretched between porcelain insulators fastened in a box. On top of the box is a regulating device for

cut out, leaving the two motors in series with the adjustable resistance.)

(7) Place trolley on the wire and regulate adjustable resistance to a current of 100 amperes. The millivolt-meter can then be connected across any field coil or the combined fall of potential of the four coils can be measured if so desired. These readings on the millivolt meter and ammeter must be taken simultaneously. By noting the fall of potential (V) while the field is carrying a known current (C) the resistance will be found by the simple application of Ohm's law.

$$R = \frac{V}{C}$$

For example: If the field is carrying a current of 100 amperes (C) and the drop of potential across the field terminals (V) is 2 volts, then the resistance R would be,

$$R = \frac{2}{100} \text{ or } .02 \text{ ohm.}$$

It will be observed that the greater the flow of current in the field, the greater accuracy can be obtained. It is not necessary to have a current of 100 amperes as mentioned, but it is desirable to have it that high.

If the field coil resistance should show too great, the trouble is likely to be in the soldered connections from motors to leads. If too low, the trouble is inside the coil.

INSULATION TEST.

In this test a high resistance volt meter having a resistance of about 80,000 ohms may be used. This is the resistance of the ordinary Weston instrument reading from 0 to 600 volts.

Before making this test the following instructions must be observed:

- (1) Pull down trolley.
- (2) Disconnect armature, field coils, or leads to be tested, making them independent from one another and remove brushes. Leave controller on the "off" notch.
- (3) Turn off lamp circuit.
- (4) Connect positive pole of voltmeter to negative terminal at fuse box or canopy switch. (See Fig. 2.)
- (5) Put trolley on wire, and with the negative wire leading from volt meter, any electrical part of the motor equipment may be tested by connecting to it, and noting the deflection. Call this deflection V , and at the same time, determine the full voltage between fuse box and track, calling it E . Knowing the resistance of the voltmeter, and calling it R , and the insulation resistance or resistance of the ground leak X .

$$X = \frac{E \times R}{V} - R$$

For example: Ground reading, 100 volts (V). Full voltage, between trolley and track, 500 volts (E). Resistance of volt meter, 80,000 ohms (R).

$$\frac{500 \times 80,000}{100} - 80,000 = 320,000 \text{ ohms.}$$

The field resistance is, therefore, equal to 320,000 ohms. In this manner, insulation resistance can be measured up to 39,000,000 ohms, or 39 megohms. It is advisable to perform the insulation test, before the resistance test of motors is made. In practice, it has been found that the insulation resistance of a motor field averages about 500,000 ohms, and the armature, 400,000 ohms. If the insulation resistance of armature or fields runs below 20,000 ohms, the motor needs attention, and should not be allowed to go on the line. Sometimes a simple drying out of the motor is all that is necessary.

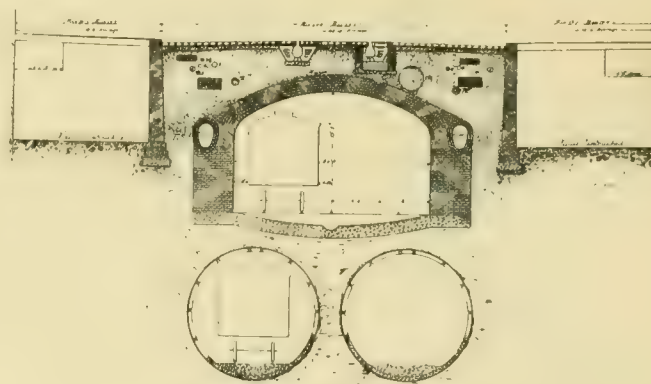
It has here been attempted to bring forward these methods in a practical form for street car motor testing, and to make them as clear as possible, and, probably more so than is necessary, to many who have used these same methods on other testing. It goes without saying, that these methods can be used in nearly all other electrical testing, around a street railway plant. It has been, however, my present object to give to the motor repair man a simple, easy method of making all his tests quickly and accurately. These results were heretofore obtained only by the use of laboratory apparatus.

These methods have been put in every-day use by the writer, for three years, and have been carried on with success by the ordinary run of motor inspectors.

NEW YORK UNDERGROUND MAY COST ONE HUNDRED MILLION DOLLARS.

In the December REVIEW it was said "Fifty millions can be spent on the New York underground railroad scheme between the City Hall and the Battery, and then the elevators that go down would be extra." It begins to look as if even that estimate was modest. Engineer W. B. Parsons has submitted a preliminary estimate to the rapid-transit commission, which places the cost of construction at \$83,050,000. In addition to this sum 10 per cent must be figured for stations, storage tracks, etc., while no estimate has been made for damages to abutting property.

The project presents many difficulties, and it is now seen that the vote of \$50,000,000 of bonds, which is the only resource of the commission, is too small. All the



UNDERGROUND IN NEW YORK.

sewers will have to be reconstructed in advance of the tunnel work, which will be of stone. The illustrations show the proposed four-track road, with street surface cable conduit, electric wire conduits, water pipe, gas pipe, sewers and other underground work required by the city ordinances. With cars similar to those in use by the Manhattan Railway it would be necessary to have 50 feet in clear between side walls as a minimum, while the clear height must be 13 feet. Broadway down-town is considered to be too expensive, and it is proposed to build a four-track railway from Union Square through New Elm street to the City Hall, with a two-track road down Nassau and Broad streets to South Ferry. A supplemental two-track road can, if required, be built from Union Square through University place, Greene and Church streets to the City Hall. A board of five consulting engineers is considering the proposed plans before final adoption by the rapid-transit commission.

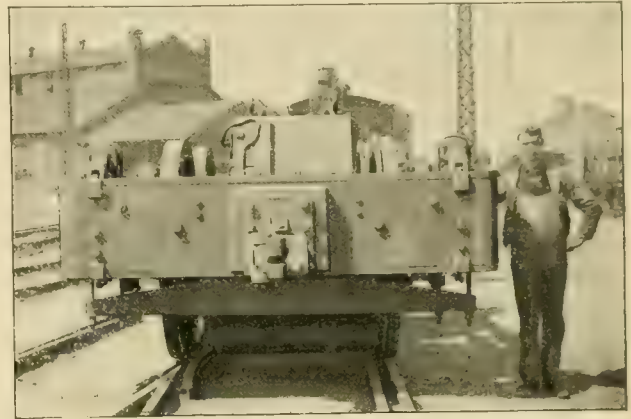
Everett K. Day is now superintendent of the Skowhegan & Norridgewock Electric Railway Company, Skowhegan, Me.

BALTIMORE BELT LINE ELECTRIC LOCOMOTIVES.

For two years electricians have been impatiently watching the progress of the electrical work in the underground tunnel of the Baltimore & Ohio Railroad, at Baltimore, Md., and at last there seems to be a prospect that the road will be put in operation next spring. When the Baltimore & Ohio Railroad decided to enter Baltimore by means of a tunnel, instead of by the present ferry, it became almost a necessity for them to select something besides steam locomotives to haul the trains through it. Accordingly, the contract was let to the General Electric Company, for an equipment of electric locomotives to haul both passenger and freight trains for a distance of about $2\frac{1}{2}$ miles. The contract included the power plant and overhead construction to go with these electric locomotives. The power plant, however, does not differ from other large electric railway plants, except that the voltage will be about 700. The great interest centers around the locomotives, and the overhead work which is to carry such heavy currents. The requirements on these locomotives are exactly similar to the requirements on steam locomotives. These will be the first electric locomotives in the world to be put in actual, every day service, hauling steam trains, and doing precisely the steam locomotive's work. Small locomotives, of from ten to forty tons, have already been built, and are doing service in various places, but they are not doing anything like the work that ordinary steam locomotives are doing.

The Belt Line locomotives that have been built at Schenectady, by the General Electric Company, weigh 95 tons, and consist of two four-wheel trucks, with a motor on each axle. The truck frames are of forged

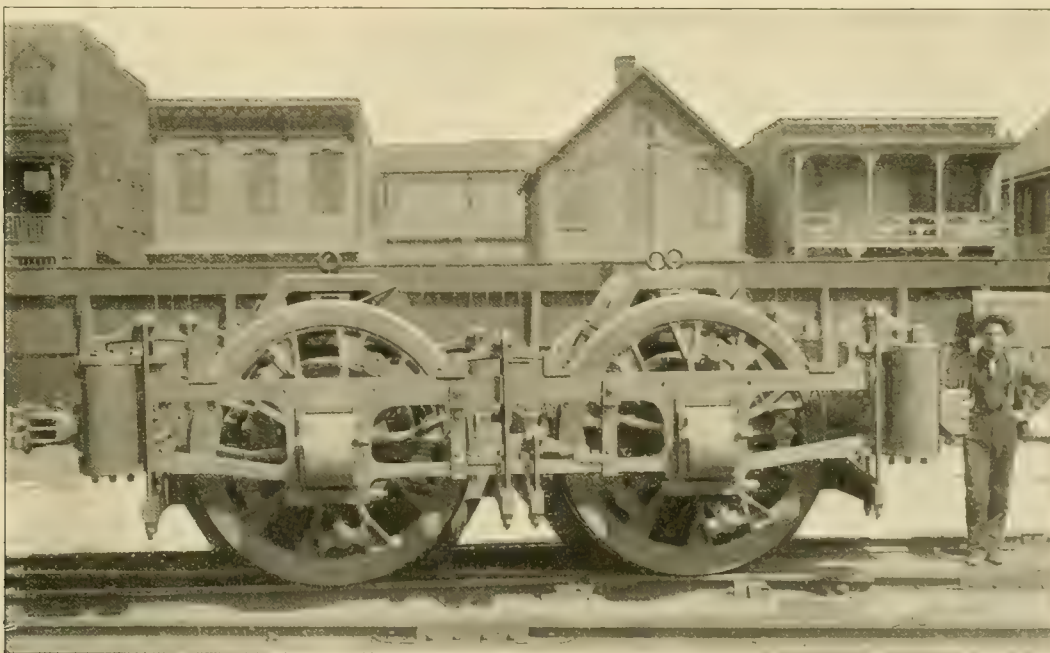
iron, and the driving wheels of cast steel, 62 inches in diameter. The motors on each axle are mounted so as to give the effect of a flexible coupling between them and the axle. A hollow shaft carries the armature, and through this passes the wheel axle. A universal coupling, between the armature shaft and car axle, allows of a spring suspension of the motors. Each of the four motors will be of 320-horse-power,—the largest railway motors in the world. The cab, of sheet iron and wood, contains



END VIEW OF TRUCK—B. & O. ELECTRIC LOCOMOTIVE.

the series-parallel controller, and an air pump, run by a small electric motor, which will supply the air brakes and whistle.

The dimensions are: Length, 14 feet, 3 inches; width, 9 feet, $6\frac{3}{4}$ inches. Its speed is 15 miles an hour, when exerting its full draw bar pull at rated capacity, 30 miles an hour, when exerting half its draw bar pull, and 50 miles an hour, maximum speed. Its usual speed with a train will, it is said, be 30 miles an hour. As said before,



SIDE VIEW OF ONE TRUCK—B. & O. ELECTRIC LOCOMOTIVE.

the locomotive is designed for heavy work, and will be called upon to handle trains as heavy as those now handled by the heaviest steam locomotives. A test of one of the completed trucks, as shown, representing one-half of the locomotive, was recently made upon the tracks at the Schenectady works of the construction company. In order to obtain the necessary load, a New York Central, heavy, six-wheel engine was made use of, and the electric locomotive truck coupled to it. The machines were then sent in opposite directions, and tugged at the connecting coupling as in a tug of war. The electric locomotive had a slight advantage over the steam engine in weight on the driving wheels, and pulled it up and down the track with apparent ease. For the same weight upon the drivers, it was shown that the electric locomotive will start a greater load than the steam locomotive, the pull being constant throughout the entire revolution of the wheel, the difficulty of variation of pull with the angle crank, as in the steam locomotive, being eliminated. The test also proved that not only were the motors sufficiently powerful, but that the driving mechanism and armature couplings are amply strong to transmit the torque of the armature to the axle.

The power house is rapidly nearing completion, and the generating machinery is almost ready for installation. The overhead apparatus, which has been especially designed to meet the extraordinary requirements, will shortly be in position, and before many months have passed, the steam locomotive will have become a natural object in the operation of trains in the Belt Line tunnel, which, untarnished by smoke and soot, will be brilliantly lighted by incandescent lamps.

Instead of using trolley wires, the current will be taken through a shoe sliding, between two iron Z bars. These are hung by insulators from the roof of the tunnel, and outside of the tunnel iron side posts will support girders, from which the Z bars will be hung. The enormous current taken by these locomotives, necessitated something heavier than trolley wire. Switches can also be put in the overhead work, similar to those on the track, so that there will be absolutely no uncertainty as to the overhead contact, a thing not possible with the trolley.

NEGLECTED EDUCATION.

The trolley car had run against the potato pedler's cart and the language the potato man was using was almost melting the wires overhead.

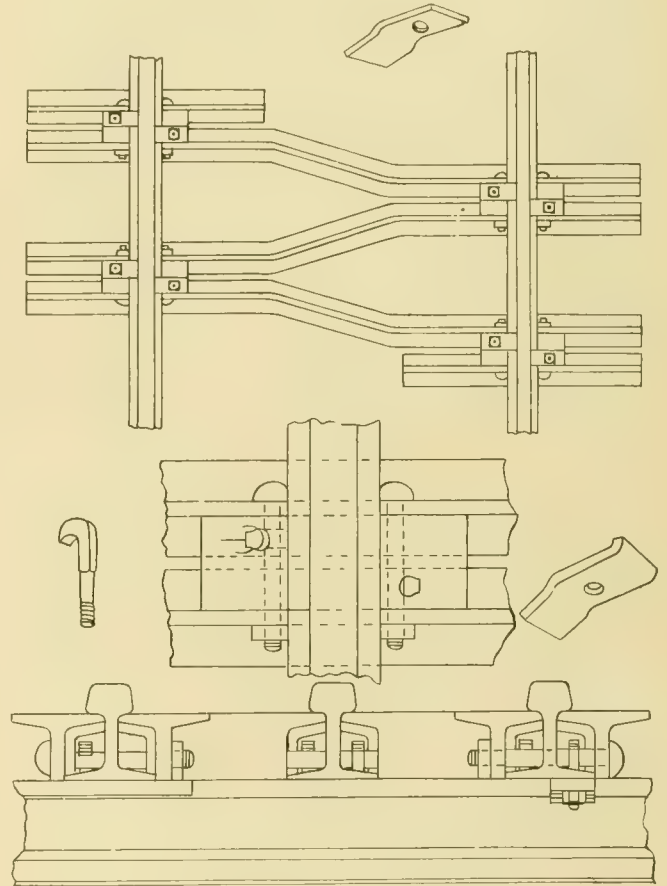
"It is a great pity for one's early education to be neglected," said the ministerial-looking passenger who sat next to him. How evident it is that the poor fellow has never known the influence of a refined home."

"I was not thinking of him so much as myself," said the fat man. "One of the confounded cars ran into my buggy the other day and the motorman outswore me in two minutes."

J. F. Randall has been appointed electrical and mechanical engineer of the Detroit Railway, Detroit.

BENJAMIN METAL TIE.

One of the most recent plans for making use of old rails for ties is that of Newton Benjamin, contracting freight agent of the Central Railroad of New Jersey, at Elmira, N. Y. The T rails are bent so that they form V-shaped figures to oppose the tendency of the track to



BENJAMIN METAL TIE

get out of line. The arrangement is made plain by the engravings. While the weight of such ties will be greater than if the old rails had been rolled into another form, the plan has the advantage that the rails do not have to be sent to a rolling mill before they can be used as ties.

HAD A PERFECT FENDER.

"I've devoted a heap of study to it," said the inventor, "and now I believe I've got a cable-car fender that'll do the business."

"A cable-car fender?" repeated the philanthropist.

"Yes, sir."

"Well, peg away. Mebbe you'll discover a means of attaching the thing to a foot ball eleven. If you do that, I'll see that you get enough life-saving medals to fill a trunk."

J. S. Hill has resigned as superintendent of the La Fayette, Ind., Street Railway Company, and has been succeeded by Mr. Gunn, of Philadelphia.

STREET RAILWAY LAW.

EDITED BY FRANK HUMBOLDT CLARK, ATTORNEY AT LAW, CHICAGO.

Bill to Enjoin Construction of Street Railway in Country Road.

Under a bill filed by several complainants to restrain the construction of a street railroad on the ground of alleged irreparable damage, only those grievances which are common to all the complainants are competent to maintain the bill; special damages suffered by some of the parties are insufficient.

The fact that a franchise granted by a township, for the construction of a street railway along a country road, authorizes the track to be laid near the side of the highway, instead of in the center, does not affect the validity of the grant.

The use of "T" rails by a street railway company does not show an intention to construct an ordinary commercial railway.

Grant J.: The defendant, is organized under Chapter 95 of Howell's Statutes, known as the Street Railway Act. Its purpose, as declared in its Articles of Association, was to "construct and operate street railways in and through the streets of the city of Detroit and the suburbs thereof, extending through the roads and streets of the townships of Hamtramck, Greenfield, Spring Wells, Grosse Pointe, Dearborn, Ecorse, Monguagen, the city of Wyandotte, and through the streets of the villages in said townships."

In March, 1891, the township board of the township of Ecorse granted to it a franchise for constructing and operating such railway through the township over what is known as the Monroe and River Road. The rails were to be laid flush with the surface of the street, were to conform to the grade thereof, and to be so constructed as to least inconvenience or obstruct public travel. The space between the rails was to be kept in good condition, sufficiently hard and smooth to afford good ground for wagon travel, paved with cobble stones, or planked, or laid with crushed stone, at the option of the defendant.

The track was to be laid in the center of the highway and so as to leave a driveway on each side at least fourteen feet wide. It was to be allowed to use either motor or electric power to propel its cars. It was at liberty to lay any approved street railway rail, except a "T" rail.

In November following, the franchise was amended by the town board, permitting the company to construct its roads on the east side of the highway, the center of the railway to be within twenty-two feet of the east line of said highway, and the west rail to be eleven feet east of the center of said highway, to be determined by a survey made by a competent engineer at the expense of the company.

The ends of the ties projecting outside the track adjacent to that part of the highway used for public travel were to be filled and packed hard flush with the top of the ties, and the center of the track between the rails was to be ballasted flush with the rails as near as could be done without interfering with the safe running of cars. It was also permitted to use a "T" rail, so laid as to least inconvenience public travel, and at all road, farm and house crossings the tracks were to be planked flush, so as to leave no obstruction of the feet or wagon travel.

These are all the provisions of the franchise which it is necessary to mention. The Monroe road was an ordinary country highway, with ditches on each side of that portion provided for travel.

The defendant was proceeding to construct its road when the complainants, eighteen in number, filed this bill, claiming irreparable damage to the property and praying that the defendant be enjoined from constructing it. The bill can be maintained only upon the theory that there is some grievance common to all resulting in a damage common to all. The bill alleges, and there is evidence tending to prove, grievances and damages special to one or more of the complainants.

Such bill cannot be maintained, and we need consider only these objections to the road which are common to all. These are: 1. That the franchise confers the right to construct an ordinary commercial railway, and that it is the intention to construct such road. 2. That the operation of the railway will irreparably injure the complainant's property. 3. That the defendant is pecuniarily irresponsible.

Upon the filing of the bill a preliminary injunction was granted. An answer was filed denying that the defendant intended to construct a commercial railroad or any other than an ordinary street railway, such alone as it was authorized by the law to construct, and denying fully all the material allegations of the bill. Upon filing this answer the preliminary injunction was dissolved and the defendant proceeded to construct its road.

At the time of the hearing the railroad had been constructed and operated for a considerable time. For four months it used a motor. It then changed and equipped its road with the trolley system, with electricity as the motive power, and it is now the ordinary electric street railway, such as this court had held to be authorized by the law, and which may be constructed without proceedings to condemn the right of way.

(Detroit City Railway Company vs. Mills, 96 Mich., 634. Dean vs. Ann Arbor Street Railway Company, 93 Mich., 330. People vs. Fort Wayne and Elmwood Street Railway Company, 97 Mich., 532.)

The right to grant this franchise for the construction of a street railway such as this is, was conceded by counsel for the complainants upon the argument. Their chief complaint is, that it should have been laid in the center of the highway. We are cited to no authority holding that such railroad may not be located in any part of the public highway. It seems clear, that a road so located would better convenience public travel on a country highway, than if placed in the center of the traveled portion thereof.

It is not seriously contended that this is not so, but that it is so near the frontage of some of the complainants' premises, as to interfere with the use thereof. The track

may be so near the buildings of some of the complainants as to entitle them to a remedy, provided that they, themselves, have not encroached upon the public highway.

The bill alleges that this highway varies in width from 44 to 60 feet. It is contended by the defendant that the road was laid out to a uniform width of 66 feet, and that such complainants have unlawfully encroached upon it. We pass no opinion upon this, as it is a grievance common to but few of the complainants.

The franchise especially and particularly provided for the construction of the road so as to afford proper ingress and egress, to the owners of adjoining lands. Where the highway is 66 feet wide, ample space is left between the tracks and the line of land abutting on the highway, for the construction of sidewalks, and all other necessary and convenient purposes. This is a compliance with the law, because no one is deprived of the use of the highway, or of ingress and egress to his property.

The use of a "T" rail does not establish the commercial character of the road. The evidence shows that this rail can be used without serious trouble and inconvenience.

The proofs establish these facts: (1) The substantial compliance with the provisions of the franchise. The road is constructed on the grade of, and flush with the highway, and was so done under the direction of the highway commissioner. The center between the tracks is filled as required. (2) The construction of this road is a great convenience to the public. (3) It has enhanced the value, to a great extent, of the lands situated along its line, including those of the complainants. (4) Its removal or disuse would result in an irreparable injury to the defendant and its assignee, which now owns and operates it.

It is claimed that this case is ruled by *Nichols vs. The Ann Arbor Street Railway Company*, 87 Mich. 361. The distinction is so apparent, and will be so readily seen, upon a comparison of the facts of the two cases, that we refrain from comment upon them.

The decree is affirmed with costs. Long, Hooker and Montgomery, J. concurred.

McGRATH, C. J.: I cannot concur with my associates in the conclusion reached herein. Defendant's track is supposed to occupy a portion of the roadbed ordinarily devoted to travel. If so constructed as to exclude the public from that part of the roadway used by it, complainants have a right to complain. Street railway use of streets or highways cannot be allowed to be exclusive.

This railway is constructed upon a sandy roadbed with a T rail. One of the defendant's witnesses describes it as "a very deep sandy road."

The roadbed was cut in some places, and in others filled. It is conceded that at certain points the top of the rail is below the surface of other portions of the road, so that a rain washes the sand upon the rail, and, as one of the defendants says, the rails have to be brushed off in order that the electric connection may be made. I think that it is the duty of defendant to restore the road to its former condition for the purpose of travel, and to so con-

struct its road that the public shall not be excluded from that part of the highway.

The only difference between the surface of this road as constructed at any point and that of the ordinary commercial road, is that the space between the rails and immediately outside of the tracks is filled in, not with gravel or cinders or some substance that will carry wagon wheels, but with sand, through which the wheels plough until they reach the rails.

Under the statute requiring railroads to restore the highway the spaces between the tracks and for a short distance outside the tracks is planked or paved so as to admit of free passage over the tracks. It is contemplated that the portion of streets and highways occupied by street railway tracks is to be used by the public with the other portions of the highway.

I do not think that defendant should be allowed to maintain or operate the road until this objectionable feature has been removed.

(Supreme Court of Michigan. *Niemann v. Detroit Suburban Street Railway Company*. Not yet reported.)

Person Standing on Footboard of Electric Car—Injury by Pole.

A trolley railway company should foresee the possible danger to which passengers on the footboards of its cars may be exposed by a slight movement of the body when trolley poles are placed from ten to twelve inches from the edge of the footboard.

A passenger is not bound to anticipate the danger and be on the lookout for trolley poles, while riding with permission on the footboard of a street car, unless he has knowledge of the proximity of such poles to the track.

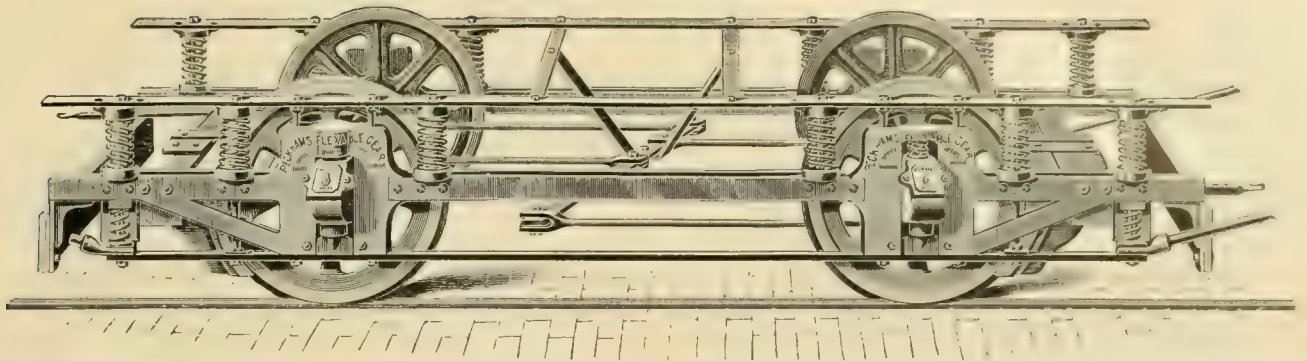
It is not prima facie the fault of the passenger, where he is injured by riding on the footboard of a trolley car.

(Rhode Island Supreme Court. *Elliott v. Newport Street R. Co.*, 23. *Lawyer's Reports Annotated*, 208.)

Passenger Riding on Front Platform—Driver Striking Horse with Whip—Passenger Falling from Car.

Where a passenger is injured by falling from the front platform of defendants' street car, he cannot recover damages merely on proof that the driver whipped his horses, and that they made a sudden plunge, which caused the car to lurch.

While it is not negligence, as a matter of law, for a passenger to ride upon the front platform of a street railway car, yet a person who voluntarily so rides assumes the usual and ordinary dangers of his position. He is compelled to stand, and is not protected from the jolts and sudden movements of the car, except by the use of his eyes and hands. It is a matter of every-day life to see passengers riding on the front platforms of our closed street cars, and it is a matter of common sense that there is more danger in riding thereon, than inside the cars or on the rear platform. The driver of a horse car has to use his whip, and it is not negligence for him so to do, any more than it would be on the part of the driver of any other vehicle. The passenger on the front platform knows that the driver uses the whip, and is aware of the



PECKHAM EXCELSIOR TRUCK FOR TRAILER CARS.

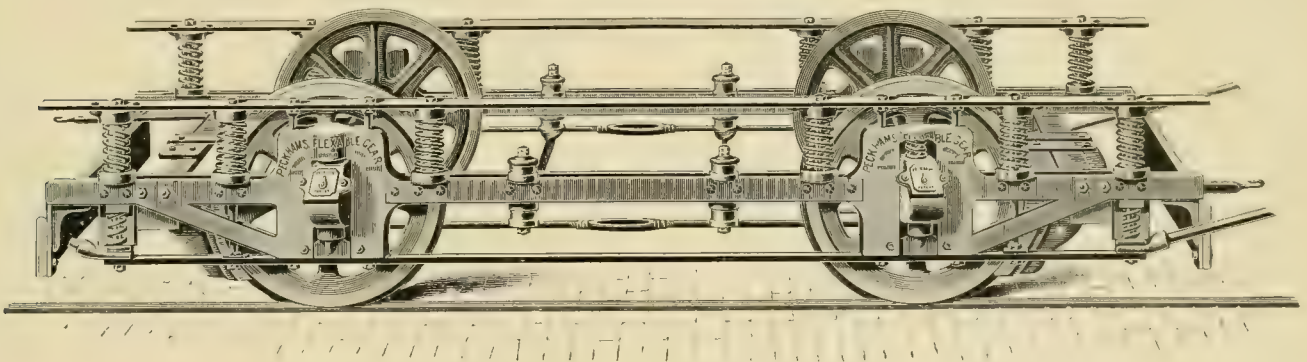
usual effect upon the horse. The animal, when the whip is used, starts suddenly and moves more rapidly. Such is the intention of the driver when he uses the whip.

(City Court of Brooklyn. *Cassady v. Atlantic Ave. R. Co.*, 29 New York Supplement 724.)

PECKHAM'S NEW EXCELSIOR TRUCK.

Something new in a truck that can be used either on trailer or motor cars as desired is illustrated herewith. It is known as the new Excelsior, which is designed by E. Peckham, president of the Peckham Motor Truck &

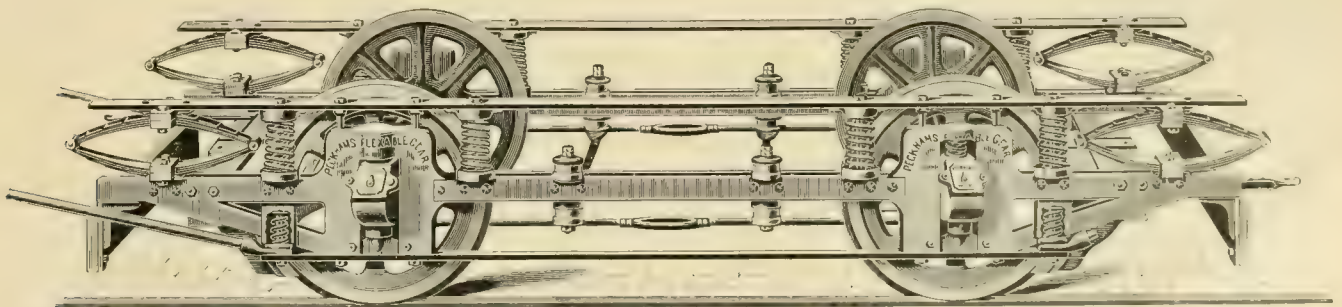
driven rivets. There is a steel top frame connecting the different springs. Fig. 1 shows the construction of the trailer truck, while Fig. 2 shows it as a motor truck with all spiral springs, and Fig. 3 shows the motor truck with both spiral and elliptical springs. The yokes are provided with Peckham's flexible gear, which supports the truck frame upon the Peckham dust-tight, self-lubricant journal boxes by graduated spiral springs. A truss extension for open cars is supplied when desired. Although somewhat lower in price, the Excelsior trucks are made with the same degree of care as to details, as is used in the construction of all the Peckham all-steel machine-



PECKHAM EXCELSIOR TRUCK WITH ALL SPIRAL SPRINGS FOR MOTOR CARS.

Wheel Company, who has sought to meet the requirements of certain roads that favor a cheaper construction than the company's all-steel, machine-fitted trucks. The new Excelsior is constructed upon the same principle as Peckham's cantilever extension truck. There are no bolts used in its construction, the pedestal and spring supports being cast in one piece and secured by hot-

fitted trucks. The new Excelsior trucks are guaranteed to give entire satisfaction with regard to easy riding, and to be the best made low priced truck on the market. Further details and prices can be obtained at the company's general sales office, 26 Cortlandt street, New York, or at the branch offices in Boston, Chicago, Philadelphia, Pittsburg and San Francisco.



PECKHAM EXCELSIOR TRUCK WITH SPIRAL AND ELLIPTICAL SPRINGS FOR MOTOR CARS.



REQUEST ARTICLES.

Articles under this head are prepared at the request of street railway men who have expressed desires to see articles compiled on the subjects taken up.

WHAT IS THE PROPER DAILY MILEAGE FOR A CAR?

This is a question that has a very important bearing on the earning power of a road, and for that reason is worthy of a great deal of attention. As we have shown in previous issues, the main secret of the financial success of the electric road as compared to the horse road is in the greater speed of the electric car. This speed, which averages more than double the speed of horse cars, enables a car and a given number of trainmen to do twice as much work in a day; or in other words, to run twice as many miles and carry twice as many people. Besides this, the greater speed attracts travel that would not come if it was slower.

An arbitrary figure can not be set down as a proper mileage for all cases because one road may be running through crowded streets and another across suburban prairie. It is the manager's duty to make every car "earn its salary," if we may be allowed the expression. Every minute that a car is on the road with its crew, it is taking money in the shape of motorman's and conductor's wages and interest on the money invested in it. The amount it can earn to counteract this depends on the number of miles it can cover in a day. The cost of power is a small item in the total operating expense.

Some cars on suburban runs are making from 250 to 300 miles per day, and there are very few that do not make 110 even on crowded city runs. The total average daily car mileage of a system is of course cut down by the fact that some cars have to be kept in reserve for special occasions. However, as such cars are not provided with paid train crews while they are in the barns, the only loss by them standing idle is the interest on the money invested in them. When once a car is on the street, however, it should be kept moving as fast as practicable. Lying over time at the ends of routes is a dead loss to the company and should be cut down as much as practicable. It is better on a small road to have a car occasionally lose a trip on account of a blockade rather than have a long lying over time continually eating into the dividends.

A high daily mileage should not be gained at the expense of too quick starts, as this throws too much strain on the motors. It is better to have the motors built for a high maximum speed and they will then not need to be crowded on the start. It is one thing to wear out a car by continuous hard service. It is another thing to wear it out by abuse, but some managers do not seem to see the difference. They argue that it wears a car

out quick to run it many miles a day and therefore keep the mileage down, forgetting that a car can not earn unless it runs.

The assignment of train crews to cars in case of a large mileage per car takes some study. It is a very common custom to give each crew a car and let them have exclusive use of it. This has the very important advantage of making each crew responsible for a car, but also has the very important disadvantage that it takes about twice as many cars to run a road as it would if every car was made to do its full day's work. Unless the road is one of the "holiday" kind that has to keep a large reserve of rolling stock to meet special occasions, it can not afford to pursue this policy. A car must be manned by more than one crew if it is to earn what it ought to. A plan adopted by one prominent system is to assign two crews to each car. This keeps the car busy all day and locates the responsibility for a car closely enough, so that the men will take some care of it.

The writer has in mind a suburban road which has so slow a time table that cars need never run above half their maximum speed of 20 to 25 miles an hour unless there is a blockade, and the route is of such a nature that blockades are almost never heard of. Furthermore, the cars have the track to themselves for the greater part of the distance almost as exclusively as if it was a steam road. The system is not doing its full duty to stockholders or public, although it is paying good dividends. It would pay still better ones if the motor cars were allowed to attain the speed they were built for, even for a fraction of the distance.

FOUND HER STREET.

"Will you let me know when we get to Pitcher street?" asked a woman of a Cass avenue car conductor. Ten minutes later the conductor rang the bell and bawled out: "Pitcher street."

The woman sat unmoved.

"Pitcher street!" shrieked the conductor.

The woman stared at him, but did not rise.

"Madam, this is Pitcher street. You want to get out here?"

"La, no. I want to get off at Seldon avenue, and I was told that it was the third street from Pitcher, and I thought that if you let me know when we got to Pitcher I could count the streets up to Seldon and not trouble you when we got there. That's all, thanks."

HOW LOST ARTICLES ARE HANDLED.

PART I.

Carelessness is apparently the most common trait of mankind, judging from the pile of stuff that goes through the lost article department of the larger street railway companies. Umbrellas of all kinds, sizes and shapes, are the most numerous, while false teeth, crow bars, doctors bags containing skulls, or some part of the human anatomy, false hair, lunch baskets and bags, liquor of all kinds, are a few of the articles turned in by the conductors.

The West End Street Railway Company, Boston, has an excellent system for caring for lost articles. The care of all articles found in the cars is in charge of General Manager C. S. Sergeant's office, it being the duty of one of his clerks to pay special attention to this branch of the business. There are ten stations on the road in charge of receivers at which articles found are turned in, the care of lost articles being but a part of their duty. Conductors fill out and attach to the article a blank which reads: Found 189 In Car No. Route No. Trip No. Going Time Conductor No. . The receiver hands to the conductor a printed postal card addressed the general manager's office reading: I have this day at M, turned in to to receiving officer article found in Car No. Route No. Going Date found Time found M. Conductor No. These words appear on the card, "This card must be mailed at once by conductor on whose car article herein referred to was found."

A detailed record is kept by the receivers of the various articles turned in to them, together with a list of the names and addresses of the persons to whom the articles are delivered, when same have been claimed and properly identified. A report is sent to the general manager every day as follows: "To the general manager: The following article found in car have been received at this office to-day: Article No. Date found Time found M., on outward or inward trip Route No. Car No. Conductor, Name No. Article Description and contents Receiving station Receiver."

On this blank must be reported all addresses found in articles. At the same time he must send a report of articles delivered as follows: "To the general manager: I have delivered articles to-day, as follows: Article No. Description Contents, if any Delivered to Rewards paid Receiver Receiving Station . In reporting articles delivered, fill out blank spaces in full." This enables the main office to make answers to inquiries in regard to articles lost, as people are constantly going there in search of articles. In the event of information being found in the package, the parties are notified by postal card from the general manager's office in this form: "Boston 189 Arti-

cle answering description of one lost by you has found. Articles must be identified. West End Street Railway Company.

Articles of special value, such as sums of money, watches, jewelry, etc., are held at the different stations for seven days, and then forwarded to the general manager's office, receipt being given the receivers in this form.

"Received this day from Receiver at Station: Art. No. Description and contents Receipt No. ." All ordinary articles are held by the receivers for from four to six weeks, and if then unclaimed, are collected and stored to await possible claimants.

Conductors on lines which do not pass any of the ten stations, turn in articles found at the car house to which they run, the foremen of which deliver identified articles to owners, forwarding receipt and the first blank described, together with undelivered articles, to one of the receiving offices. The form of receipt is shown herewith. Each article as soon as received is furnished with a tag, which shows date, car No. and conductor who turned it in. The average number of articles received each month is 750, of which 50 per cent are claimed and delivered to owners. Occasionally a large sum of money is found, but the owner is close behind, and such articles have always been delivered promptly. Addresses in pocket books by which owners can be notified are conspicuous by their absence. All rewards left either at the receiving stations, or at the general manager's office, are transmitted to the conductor finding the article for which the reward was paid.

CELEBRATES ITS TENTH YEAR.

"Dixie," that bright exponent of southern industrial interests, celebrates its tenth anniversary with a souvenir edition that is a work of art. The cover is white, the title page being in raised golden letters with a background of delicate green. A handsomely gotten up bird's-eye view of the Cotton States and International Exposition, Atlanta, accompanies the number as a supplement. The literary and advertising features are up to the same high standard that have placed Dixie in its present position, and we congratulate Editor Martin and Manager Allen on their handsome magazine and evident prosperity.

John H. Passmore has been retained as superintendent of the consolidated roads of Norristown, Pa.

189

I have this day received from the
West End Street Railway Co. article lost by
me on _____ Car
_____ Value _____
Street & No _____
Town, _____
Reward paid, _____

Description and Contents of Article.

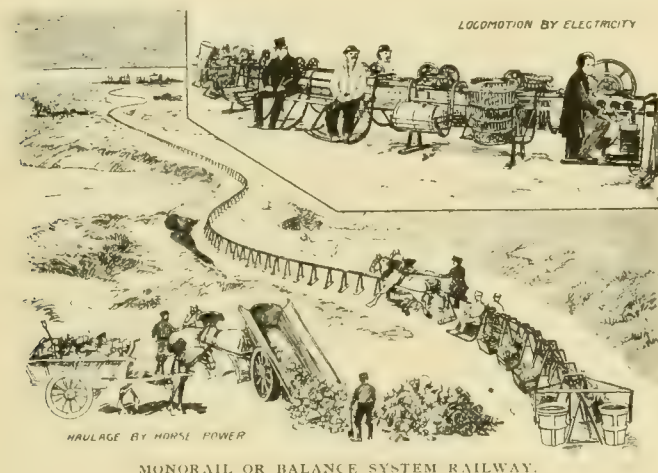
Delivered by _____ Title _____

RECEIPT—LOST ARTICLES.

LIGHT RAILWAYS.

Under the auspices of the Board of Trade, of London, England, a conference on light railways was held last month. Upon light railways, it is believed, the future of the agricultural districts depends. In many districts the produce of the soil is allowed, or rather, compelled, to rot, because it cannot reach the consuming sections. Whether light railways, or electric roads, will best serve the purpose, has not been decided, but, this much is certain, something is badly needed for those sections that are isolated from railway communication.

No definite action was taken by the conference except to appoint a committee, which will report to an adjourned meeting the latter part of this month. The members of the committee are: Sir Michael Hicks-Beach, the Duke of Sutherland, Sir Courtenay Boyle, permanent secretary to the Board of Trade, and F. J. S. Hopwood, assistant secretary, Railway Department of the Board of Trade; Sir B. Samuelson, Sir Alfred Hickman, M. P., and Sir



Albert Rollet, M. P., these three representing the Association of Chambers of Commerce; Lord Claud Hamilton and W. L. Jackson, M. P., of the Railway Companies' Association; Mr. Beachcroft, London County Council; Lord Cathcart, of the Royal Agricultural Society of England; Lord Edward Fitzmaurice and Henry Hobhouse, M. P., of the Association of County Councils; Sir B. Baker, of the Institution of Civil Engineers; Alexander Siemens, of the Institution of Electrical Engineers; Mr. Channing, M. P., of the Central and Associated Chambers of Agriculture; Mr. Carruthers Wain, of the Tramways Institution of Great Britain and Ireland; Lord Thring, Sir A. Rendel, Sir A. Clarke, Messrs. W. Meik, W. M. Ackworth Story, M. P., Humphrys Owen, and Sellon.

During the conference, it developed that the cost of light railways would be between \$10,000 and \$20,000 a mile, and a special act of parliament would be required. As that august body will meet February 5, some plan of action may be decided upon by the conference. It was stated that farmers within forty or fifty miles of big cities cannot sell their produce, largely because of lack of

transport, while the inhabitants of these same cities are compelled to pay high prices on account of the comparatively small supply of the very kinds of produce that cannot get to the market. Speeches were made by many members of parliament, but no one dwelt on details, even the important question of gages, was left out of the discussion, while cost of operation and speed, were hardly mentioned. It was proposed that the roads be built by private capital, and it was suggested that a tax be levied on the towns to pay for the cost of construction. As no decision was reached, it is believed the committee will have some recommendation to make.

Light railways are in use in Belgium, France, Italy, and in some parts of Africa, where they are used for the same purposes, as is being agitated for England. The illustrations, which are reproduced from the London Graphic, have a strange appearance to the eyes of Americans. They represent an application of the "monorail," or Lartigue balance system, which has been successfully used in Algeria, Russia and France. It consists of a single rail above ground, on which is suspended an apparatus like panniers, which, balancing, run on grooved wheels. It is said that two workmen can set up several hundred yards of the line in a day. The haulage power necessary to move a load is said to be 30 per cent less than on a double track road. The lower engraving shows haulage by horse-power, and the upper one, with electricity as the motive power. The latter also shows the wheels on the rail.

In Belgium, light railways are under the control of the Societe Nationale des Chemins de Fer Vicinaux, organized in 1885, for building and operating light railways. It has now 730 miles of a gage of 3 feet 3.37 inches. The cost of construction has been, including rolling stock, etc., about \$13,500 a mile. The capital of the company is furnished, one-fourth by the state, and three-fourths by the provinces. This corporation was organized when the light railway system was in its beginning. Although in 1865, an 18-inch gage railway was built, in Chatham dockyard, near London, and in 1880, an attempt was made to organize a company to operate under the Decauville patents, under which a system was being operated with fair success in France, no progress was made in England towards the adoption of the new class of roads. Even now, with all the agitation, nothing may come of the project.

A tramway four miles long is planned between Drumpellier and Clarkston by the town councils of Airdrie and Coatbridge, Scotland.

The municipality of St. Petersburg, Russia, has been asked by the Finland Passenger Steamboat Company for permission to run an electric railway on the ice of the river Neva, from the Palace to the Mytninski wharf. Cars are to have capacity for twenty passengers, and are to run at the rate of thirteen miles per hour. This will be something new under the sun.

ELECTRICAL STEEP GRADE TRACTION IN EUROPE.

Abstract of a Paper Read Before the Institution of Electrical Engineers, England, by C. S. Du Riche Preller.

The rapid growth of electrical traction in Europe, wherever local conditions and reasonable official regulations are conducive to its adoption, is evidenced by the fact that within the last few years it has also been extensively applied, and is in course of further application, on steep grade, or mountain railways properly speaking—that is, on lines which have not only occasional steep grade sections, such as occur, for instance, on many electrical tramways, but continuous gradients varying from 5 to 25 and upwards of 60 per cent (1 in 20, 1 in 4, and 1 in 1.6 respectively), and which connect either the base and summit of a given declivity, or different districts separated by a mountain range.

It will, therefore, not be inopportune if I place before the Institution a short synopsis of what has been already done in Europe in that branch of electrical engineering, together with certain conclusions and proposals founded on my own experience.

Leaving aside for the present, as being more suitable for separate treatment, the question of heavy—viz., 50 to 100 tons—electrical locomotives for trunk railways, the working of steep grades by electricity may be considered under two heads:

1. By cable traction; and,
2. By motor cars or locomotives with fixed conductors.

CABLE TRACTION.

Up to a recent period steep-grade cable railways in various parts of the globe, but notably in Switzerland and in the Alps generally, where they alone exceed twenty in number, have been constructed for being worked either by component of gravity with water ballast, in conjunction, on some lines, with a second or compensation cable, or in some cases by fixed hydraulic, gas or steam motors.

The principal disadvantage common to all lines worked by component of gravity consists in the excessive additional dead load due to the water ballast, which entails not only a great deal of additional brake power per se, but a variety of complicated safety brakes, involving very careful manipulation, while the three systems of fixed motors are either uneconomical or unwieldy and obsolete.

The superior advantages of cable traction by electrical motors, as compared with all the other systems referred to, have been attested by three lines in Switzerland, all of which have been constructed within the last four or five years—to wit: The Burgenstock, on the Lake of Lucerne; the Monte Salvatore, on the Lake of Lugano, and the Stanserhorn, near the Lake of Lucerne, which last named was opened for traffic only last year. It is not the purpose of this paper to give a detailed description of these lines; suffice it to point out their salient, and more especially their electrical features.

(a.) *Burgenstock*.—The summit level of this line is 2,884 feet above the sea, the total rise being 1,443 feet in a little over 1,000 yards, the minimum grade, 32, and the maximum 58 per cent. Electric motive power for working the cable and cars is obtained by high tension (1,600-volt) transmission from a hydro-electric power station 2.5 miles distant, the output of the two-series coupled direct-current Thury dynamos, given by a high-pressure turbine, being 40 kilowatts, or 60-horse power. Two corresponding series-coupled motors at the summit of the cable railway drive the cable-winding drum through belt, countershaft and bevel gearing, the total reduction being 700 to 5 revolutions, or 140 to 1, corresponding to the regulation car speed of about three miles per hour. The car speed is regulated from the motor station, and not by the driver, except in case of emergency.

(b.) *Monte Salvatore*.—This line has a summit level of 2,900 feet, the rise being 2,000 feet in a length of 1.2 miles, the initial grade at the base 17, and the maximum at the summit 60 per cent. The motor station is situated midway up the incline, and the power is derived by a 2,000-volt transmission from a large hydro-electric 1,500-horse power station five miles distant, the output of the Oerlikon (Brown) direct-current generator, driven by a high-pressure turbine, being 60 kilowatts. The corresponding motor on the line drives the cars and cable in precisely the same way as on the preceding line, except that the Salvatore incline is worked in two sections.

(c.) *Stanserhorn*.—This line ascends an altitude of no less than 6,200 feet above sea level, and has a total rise of 4,570 feet in a length of 2.5 miles, worked in three sections, having maximum gradients of 30, 60 and 62 per cent respectively. The requisite power per car is 40-horse power, and a motor station is placed at the summit of each section. The three Thury motors actuate the winding drums, as before described, and are fed from the same power station as the Burgenstock line, but by a separate high-tension (2,000-volt) transmission 2.5 of a mile in length. The total efficiency on this, as on the other lines, is about 60 per cent.

(d.) *Conclusions*.—The three lines, of which I have given a necessarily very incomplete resume, mark a conspicuous advance in cable traction. As compared with haulage by the other systems referred to, they show a saving in car weight of no less than 50 per cent, the full carload, with 36 passengers, being in the former case 12 to 15 tons, and on the electrically-worked lines only 6 to 7 tons. Again, the average cost of construction of the Swiss cable railways worked on the older systems, is no less than \$205,000 per mile, whilst that of the electrical lines is only \$120,000 per mile, or 40 per cent less. Similarly the working expenses on the older lines vary, with one or two exceptions, between 60 and 80 per cent, whereas the electrical lines are worked at 45 per cent of the receipts. These three lines also show a remarkable development due to electrical traction per se, inasmuch as, apart from the unprecedented grades, up to 62 per cent, or 1 in 1.6, the length of the incline has been gradually increased from 1,000 to 2,200 and 4,500 yards, which,

having regard to the mechanical work performed on the grades, is equivalent to 14, 20 and 44 miles respectively on the straight and level. And, lastly, the superior safety and smoothness of electrical working, attested by the Burgenstock and Salvatore lines, has made it possible to dispense on the Stanserhorn incline with the rack used as a safety factor on its two predecessors; so that on Stanserhorn electrical traction has achieved the feat of scaling Alpine altitudes, which, it was hitherto believed, could only be reached by rack railways worked with special steam locomotives, such as those used on the neighboring mountain Pilatus, at more than double the cost per train mile.

TRACTION BY MOTOR CARS OR LOCOMOTIVES WITH FIXED CONDUCTORS.

The first steep-grade railway worked by electrical traction, with fixed conductors, in Europe, was the Florence & Fiesole line, opened in 1891. It was in succession followed by the Murren Mountain Railway, in Switzerland, opposite the Jungfrau; by the Mont Saleve line, in Savoy (near Geneva); by the Genoa, and then by the Zurich steep-grade road railways; and quite recently, by a similar line at Barmen, in Rhenish Prussia.

Of these lines, those of Florence, Murren, Genoa, and Zurich, have continuous grades of 8, 5, 7, and 6 per cent respectively, and are worked as simple adhesion lines, with overhead contact wires, and return circuit by the electrically bonded rails; while the Saleve and Barmen lines, having continuous inclines of 25 and 18 per cent, or 1 in 4 and 1 in 6 respectively, are worked with the aid of a rack, and the former has an outside conductor rail in the shape of an inverted ordinary flange rail, while the latter has overhead contact. The Murren line is the only one worked with electrical locomotives; all the others are worked by single motor cars.

(a.) At Florence, the power station, situated at the foot of the incline, comprises three Tosi boilers, three Oerlikon vertical compound 90-horse-power engines, and three belt-driven Edison bipolar dynamos with a total effective power of 245-horse-power, equal to 93 per cent efficiency. The twelve motor cars are each fitted with two 20-horse-power spring-suspended and series-coupled Sprague-Edison motors, the original ones having double-reduction, the more recent ones single-reduction spur gearing. The contact is by trolley wheel and pole, and the total efficiency of the system is 66 per cent.

(b.) On the Murren Railway, whose altitude is 5,300 feet above sea level, power is generated by a high-pressure turbine, which drives a direct-coupled Oerlikon (Brown) bipolar dynamo of 120-horse-power. The power station is situated about midway of the line, the power being derived from the torrent of the celebrated Staubbach Fall. The four locomotives weigh 7.5 tons each, and carry two 30-horse-power, single-reduction, pur-gear motors; the tractive force of each locomotive being about one-third of its weight, and the total efficiency of the system 68 per cent.

(c.) The power station of the Mont Saleve line

(summit level, 3,700 feet above the sea), is situated about a mile from the line, and comprises two low-pressure turbines and two separately-excited Thury multipolar dynamos, mounted on the vertical turbine shafts, and giving, at the low turbine speed, 500-horse-power, or only a quarter of their combined normal output of 2,000-horse-power. The twelve motor cars are each fitted with two 30-horse-power four-pole Thury motors, with double spur gear-reduction, and current is taken from the outside conductor rail by metallic slide-contact shoes. Owing chiefly to the unnecessarily heavy gearing, the total efficiency is only about 52 per cent.

(d.) At Genoa, the power station is about 1.3 mile distant from the line, and contains at present two boilers, two compound condensing Tosi 160-horse-power engines, and two belt-driven 110-kilowatt Siemens inner-pole dynamos. The present line, which is the nucleus of a projected suburban system, is worked by six cars, each fitted with two 16-horse-power Siemens motors; the reduction being 10 to 1, by chain and toothed wheel. Current is taken from the overhead wire by two Siemens & Halske's rectangular metallic contact frames.

(e.) The Zurich power station is placed at the upper end of the line, and comprises two boilers, two 100-horse-power Oerlikon vertical engines and dynamos, together with an accumulator battery of 300 Tudor cells for compensating the variations of load of the steam engine. The 12 motor cars are each fitted with two 12-horse-power Oerlikon motors. The total efficiency of the line is 65 per cent.

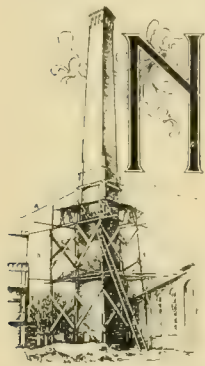
(f.) At Barmen, the power station is situated at the foot of the incline, and contains two 225-horse-power compound condensing engines driving direct two Siemens inner-pole ring dynamos, whose output is 155 kilowatts each. The line is worked by 10 motor cars, each provided with two 36-horse-power Siemens motors, which, by single spur gearing, actuate the rack pinions mounted direct on the car axles. The total efficiency is, like that of the other lines, from 60 to 65 per cent.

(g.) Conclusions.—It is seen that the primary generating power is steam on the Florence, Genoa, Zurich, and Barmen, and hydraulic on the Murren and Mont Saleve lines; the dynamos being direct-driven in four, and indirect in the other two cases. Notwithstanding the high cost of fuel in Italy and Switzerland (as much as \$7.50 per ton), and the steep grades on the Florence, Genoa, and Zurich lines, the running expenses do not exceed 9 cents per car mile; while the total working expenses, including administration and renewals, are within 15 cents per car mile, or about 50 per cent of the receipts. On the Murren and Saleve lines, the cost of hydraulic power per annum is, of course, restricted only to wages and repairs. In the former case, the working expenses do not exceed 40 per cent of the receipts; while in the latter they are as much as 80 per cent, this high rate being due chiefly to inadequate fares. A specially noteworthy feature is the steady speed of 8 to 10 miles per hour with which motor cars run up the steep adhesion inclines of 6, 7 and 8 per cent at Zurich, Genoa, and Florence; while

on the descent a speed of even 15 miles per hour has proved perfectly safe, in conjunction with the powerful and instantaneous action of the electric safety brake constituted by the motors acting as dynamos on the descent, although, for all ordinary purposes, even the mechanical brake alone suffices to stop the car within its own length.

As regards the comparative working cost of steep-grade adhesion or rack railways by steam and by electricity, I can affirm from my own experience, as well as from every other case which I have had occasion to investigate, that, irrespective of the immensely greater elasticity of the service, and, consequently, the far more rapid development of the traffic, electrical working ensures an economy of at least 50 per cent as compared with steam.

CHIMNEY 100 FEET HIGH STRAIGHTENED.



THIS corner is a view representing a brick chimney 100 feet high, which was pulled back into position from a point $28\frac{1}{8}$ inches out of plumb. It is $9\frac{1}{2}$ feet square at the bottom, $5\frac{1}{2}$ feet square at the top, with a central flue three feet square. The estimated weight is 206 tons, and the chimney stands on a foundation 14 feet deep. The soil is affected by the rise in a river, and although two similar chimneys had been already

built in the vicinity, no trouble had been experienced. When measurements were first taken, the chimney was found to lean about 16 inches, and a few days later was 22 inches out of line. No particular change was noticed for four months, when it was found that the chimney was $28\frac{1}{8}$ inches out.

A scaffolding was built about the chimney, and 42 feet above the stonework and $4\frac{1}{2}$ feet below the center of gravity of the brick work were placed eight oak timbers 6 inches by 10 inches by 10 feet. The timbers were used to spread the bearing of wire ropes over as large a section as practicable. Around the timbers were placed wire ropes, to which was fastened another wire rope $2\frac{1}{2}$ inches in diameter, having eyes at each end, the lower eye being connected with a system of eleven pulleys secured at a point 78 feet distant and opposite the direction in which the chimney leaned. Cables with turnbuckles were placed at right angles to the main cable and a guard cable was placed in the rear. The earth was excavated on the high side of the foundation nearly half way around to the bottom, a depth of 13 feet, and the main cable put under strain by the pulleys. In three weeks the chimney was straightened 4 inches. A post hole digger eight inches in diameter was used to excavate eleven holes around the trench, which relieved the pressure of the earth, and by the following morning the chimney had moved back in place eight inches. By tightening the rope three times a day and digging additional post holes when necessary, the chimney was

brought back to place in a few weeks. The holes were filled in with fine broken stone and gravel thoroughly rammed. The illustration is reproduced from Engineering News.

IS NOW A CENTURY PLANT.

Continuous publication for 100 years, successfully weathering the storms that beset all journals, is a record that belongs to only one trade journal in the United States, the Shipping and Commercial List & New York Price Current, which was founded by James Oram, a printer, December 19, 1795, in New York city. At that time Boston was as far away in time, as London is to-day, and to keep New York merchants posted on prices was the object of the journal, which was called the New York Price Current. The present name was adopted in 1816. This centennial year will be celebrated by many features, one of which called "Notable Events 100 Years Ago This Week," ought to be peculiarly interesting. We congratulate our contemporary upon its great age, feeling sure its value to its constituents during its long life cannot be measured.

TO RESTORE RESPIRATION.

Two-hand bellows, connected in the manner shown in the illustration, is the apparatus designed by Dr. P. J. Gibbons, Syracuse, N.

Y., to restore respiration when it has ceased from any cause. To the mouth of each bellows is attached a rubber tube which siamese into another that is placed in the patient's mouth. If the mouth can not be opened, a hole is cut in the neck and throat, into which the tube is inserted. With one bellows the lungs are emptied, while with the other they are filled with fresh air. This operation is continued until natural respiration is restored. The apparatus is designed for use in cases of suspended animation from any cause.



MAKES PEOPLE BREATHE.

W. H. Hull, secretary and treasurer of the St. Joseph & Benton Harbor Electric Railroad Company, Benton Harbor, Mich., was married to Miss May Belle Graham, of St. Joseph. It was the social event of the season.

J. C. Hutchings has replaced J. V. Johnston as assistant treasurer of the Citizens Street Railway Company, Detroit. He was formerly manager of the Arizona & Mississippi Valley Railroad.

ATTRACTIVE PASSENGER STATION.

In the December REVIEW was a description of the great system of the Hamilton Radial Railway Company, Hamilton, Ont. The company is progressing with its work as rapidly as it can in all the branches. Plans have been prepared and accepted for passenger stations. The



PASSENGER STATION—HAMILTON RADIAL RAILWAY.

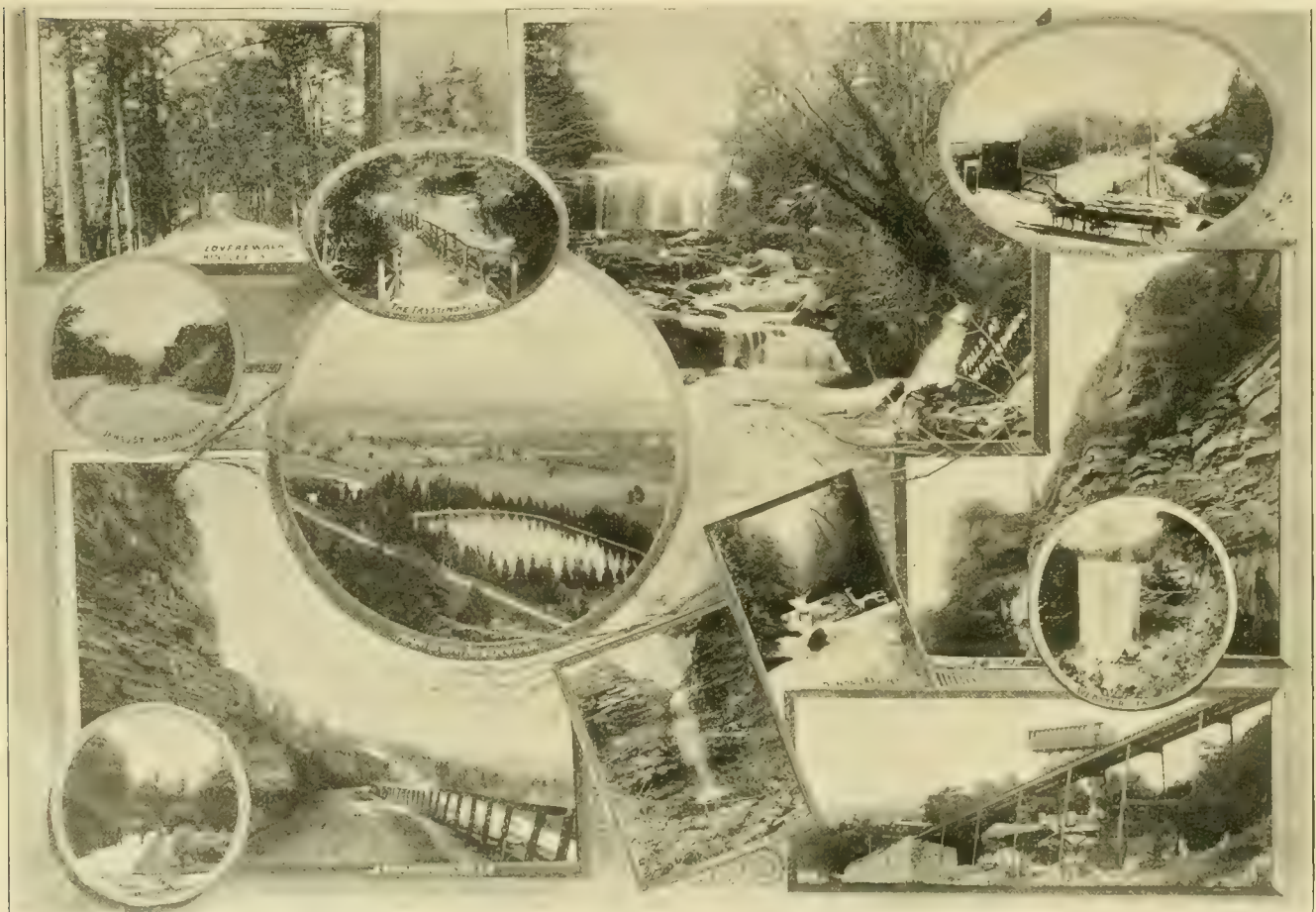
one shown herewith is to be erected at Hamilton, on James, Cannon and McNab streets. The frontage on Cannon street is 440 feet. The building will be of Credit Valley stone, which is similar to brown stone. The waiting room will be 50 by 150 feet, with balconies at both ends, one being a ladies' waiting room and the other for a dining room. The tracks for the steam road run in

front of the building, as shown in the photograph, while those of the electric road run on the other side.

The other views shown in connection with this article are taken from the immediate neighborhood of Hamilton. Judging from the views, it must be a charming place, for we are informed that there are many places as beautiful which are not shown.

ADVERTISING A NEW ROAD.

One important consideration for the manager of a new road after it is ready to be put in operation, is to get people to ride. They may patronize the cars for a day or two, while the novelty lasts, but soon appear to forget that a step in advance has been made, which gives the town a metropolitan air. A. Baumgarten, superintendent of the Freeport Electric Company, which has just opened its line at Freeport, Ill., hit upon a plan which seems to have met all requirements. While meditating on plans for attracting attention to the road Mr. Baumgarten wondered how it would do to do it through the noisy, talkative children. Excursion tickets were sold for five cents good for a ride over the entire system on Sunday. Grown persons were obliged to pay full fare. The plan worked well, way beyond his expectations, and many were unable to ride on account of the crowds. Receipts



PICTURESQUE HAMILTON, ONT.

were exceptionally large. The next week tickets were sold good for Sunday and any day in the week for the benefit of those who had conscientious scruples against riding on the Sabbath. Mr. Baumgarten has demonstrated to his satisfaction that if children can be interested in a project it does not take long to get the interest and friendship of the parents.

FINDS FENDERS FAULTY.

Down in Washington, which has the whole United States to draw on for advice in running the town, and particularly that political body the District Commissioners; they have been fussing about fenders. To find out all about such things, L. P. Bradshaw, of the engineering department was detailed, and has now made his report of the fenders thus far tried on the Washington lines, which summarizes thus:

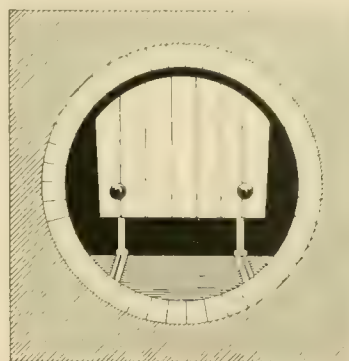
"The Smith fender does not commend itself as a mechanical device;" that the Parmenter fender "is a device similar to the Smith fender." The Sterling fender "is not adapted to cars having much oscillation." The Russ fender "requires more storage room than the present facilities of the company admit." The Hurst fender is "not believed to be able to withstand the resistance offered by immovable obstructions." The Crawford fender "does not commend itself as a safe and efficient device." The Blakistone fender "is not equal to the Parmenter fender." The Stiefel fender, he thinks, "is open to the objection of interfering with coupling and storage." The Polle fender "is open to the same objection as other fenders of this description, being inoperative for picking up a person lying with an outstretched arm in front of it."

CARNIVAL AT OTTAWA.

Beginning January 21, and continuing five days, a grand winter carnival will be held at Ottawa, Ont., the political capital of Canada. The climate is similar to that of Montreal, three and a half hours distant, where very successful winter carnivals have attracted many people, who always go again. Great preparations have been made at Ottawa to excel anything in the carnival line that has yet been produced. Ottawa is a beautiful city, of about 50,000 progressive people. Aside from the interesting and novel features of the carnival there is much to attract the attention of members of the electrical fraternity, for Ottawa is recognized as an electrical headquarters. In proportion to its population, according to T. Ahearn, managing director of the Ottawa Electric Railway Company, who specially invites a visit at this time from his electrical confreres, Ottawa has on a larger scale than any other city in America, adopted electricity in its various domestic applications. Not the least interesting of the attractions will be the operation of the Ottawa Electric Railway Company in the midst of a Canadian winter. This system, with its water-power power house, has always been a subject of much favorable comment from American visitors.

UNDERGROUND ROAD IN LONDON.

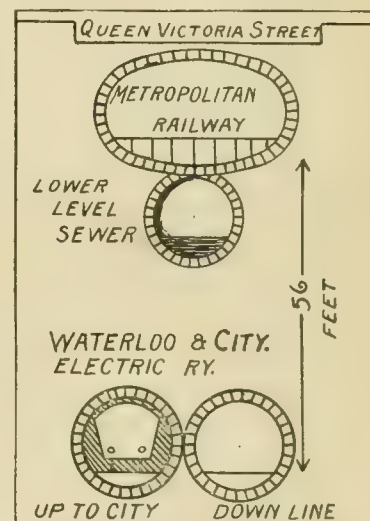
Since the approval by the people of the New York City Rapid Transit Law, resulting in the more or less active work of the Rapid Transit Commission, the interest in underground railroad systems has increased. On account of the difficulties which its construction must overcome, the Waterloo & City Electric Railway, London, Eng., presents features that attract attention. The sketch shows a cross section of the proposed line, which is



UNDERGROUND IN LONDON.

fifty-six feet below the surface of the ground, running beneath another underground railway and a sewer.

The railway is about one and one-half miles long, and a maximum speed of twenty-two miles an hour will be run. Two tunnels are being built from Waterloo station, the terminus of the London & Southwestern Railroad Company, to the Mansion House, the official residence of the mayor. At the point of beginning the tunnels are 36 feet below the surface of the ground, descending at a gradient of 1 in 60. Under the river the top of the rails is 62 feet below high water mark. The lowest point is 78 feet below the ground, and the ascent is at the rate of 1 in 88. Both tunnels will be of cast iron, and where the railway is straight or on a flat curve, the internal diameter will be 12 feet, being widened to 12 feet 9 inches, where curves are sharp. Electricity will be used to operate the cars when the tunnel is completed, which will be in two years.



SECTION OF UNDERGROUND WORK, LONDON.

The electric street railway between Herne and Bochum, Germany, has been placed in operation.

In Havre, France, electricity has completely superseded all other means of street car propulsion. Several lines have recently been finished, and one is now under construction by the Thomson-Houston Company. This is an overhead trolley line carried on posts of steel tubing, which are set 131 feet apart.

OPENING OF THE NEW ELECTRIC RAILWAY AT ATCHISON, KAN.

The first electric street railway in Atchison, Kan., which has been under construction for over a year, was formally opened December 11, by the Atchison Railway, Electric Light & Power Company. Speechmaking, fireworks and a banquet celebrated the occasion. The undertaking was begun by the Atchison Railway & Electric Light Company, which awarded the contract for the entire plant to the Great Western Manufacturing Company; but a misunderstanding arose between the two parties to the contract, and the work of construction came to a standstill. In August, 1894, the present company was formed, and the work was resumed with redoubled energy. The officers are, W. P. Waggener, president; H. A. Odell, of Chicago, vice-president; C. S. Hetherington, treasurer; and S. E. Harburger, secretary; J. A. Bendure, superintendent. These and B. P. Waggener, Ellsworth Ingalls and G. W. Riggs, of Chicago, compose the board of directors. The length of the company's lines is six and a quarter miles, all of overhead trolley construction. The power house is of brick, 75 by 109 feet, and contains four tubular boilers of 500-horse-power, three high speed engines, one railway generator of 120-horse-power, made by the Central Electric Company, and another of 137-horse-power, besides three arc light dynamos and two incandescent light dynamos. The 150-horse-power engine which drives the railway generator is to be replaced by one of 200-horse-power. The track was laid by Clift Wise & Co., of Chicago; and the power house was equipped by Cooley & Vater, of Minneapolis.

NO EXPECTORATING IN CARS.

Cars of the Milwaukee Street Railway Company contain this notice, "Conductors are required to enforce the rule prohibiting spitting on the floor of this car." In this reminder, General Manager Wyman thinks he secured the most perfect expression, so far as language is considered, that could be obtained. "I thought of putting up a sign," said Mr. Wyman, "reading, 'Gentlemen will not spit on the floor.' That would not do, for gentlemen do not spit on the floor. I could not very well add, 'others must not,' because it would be offensive to some of our patrons, by insinuating that all were not gentlemen. I think the notice now in the cars solves the problem."

THE CAR HORSE AT BRISTOL, ENG.

The American consul at Bristol, Eng., informs the Department of Agriculture that a tramway and omnibus company in Bristol, keeps and uses 800 horses. The car horses cost from \$170 to \$220, and the omnibus horses from \$270 to \$325 each. Good horses are required to climb the numerous hills in Bristol. Although cars run Sundays the horses rest one day in seven. Each

animal is required to work $3\frac{1}{2}$ hours a day and to travel $15\frac{1}{2}$ miles during that time. The daily ration of each equine is $30\frac{1}{2}$ pounds of provender. The bill of fare is quite varied, comparing favorably in this respect with the menu of the Parisian epicure, who levies upon all the world for his viands. Each animal is each day given four pounds of Canadian hay, six pounds of Irish hay; three of English straw, half a pound of bran, two pounds of Egyptian beans, six pounds of corn, three of foreign oats, and six of Danubian barley. The oats are not very numerous, and perhaps are only intended to flavor the straw. This fodder costs \$1.70 per week per horse.

ELECTRIC LIGHT STATIONS AND STORAGE BATTERY RAILWAYS.

A suggestion was recently made in a paper by Alfred H. Gibbings, before the Northern Society of Electrical Engineers, England, by which he proposes to run electric light stations, electric railway plants and refuse destructors in combination. The idea is that if these three public services are combined under one roof a greater economy can be secured in the production of electric power. The heat that would otherwise be wasted in the refuse destructor would be used for making steam. The reason for the selection of storage battery traction is that the same generating machinery can be used for storing the batteries that is used for lighting, thereby keeping down the initial investment. The batteries would of course be stored during the day and latter part of the night. If the trolley system was used there would have to be practically two separate plants. The vital objection would seem to be that there is no battery on the market to-day that has demonstrated that it can be maintained at a less expense than the entire operating expense of the trolley system.

ENGLISHMEN DISCUSS AMERICAN PRACTICE.

The English Institution of Electrical Engineers has given considerable time in its meetings lately to the discussion of American electric railway practice. Papers on the subject have been read by H. D. Wilkinson, R. W. Blackwell and P. Dawson. These gentlemen have recently been visiting among American electric railways, and between them have placed before English electricians the most complete account of American practice that has yet appeared from an English pen. A knowledge of the trials and tribulations that electric railway men have gone through here in America, can not fail to be of use to English engineers if they should ever go extensively into the business of building electric roads. Holroyd Smith, in discussing the papers, said that English electrical engineers should thank American capitalists for demonstrating what English engineers can only dream of, because British purse strings are drawn too tight. It is the fault of capitalists rather than engineers that electric traction has not made more progress in England.

DISINFECTING STREET CARS.

Under the supervision of E. H. Wilson, M. D., chief of the bureau of bacteriology and disinfection, of the department of health, all the street cars and public conveyances of the city of Brooklyn are disinfected at certain specified periods. It is the theory of Dr. Wilson, and those associated with him, that a great deal of disease is spread by people who ride in public conveyances. The object of the department is to disinfect only those portions of these vehicles which are likely to be soiled by the sputum of passengers. It is believed that when the sputum becomes dry, the bacilli are removed, and become scattered by the currents of air. Persons who breathe this air take in the bacilli, which, if conditions are favorable, develop and cause disease.

As a result of a conference between Dr. S. Taylor Emery, commissioner of health, and representatives of the street railway companies, a plan of disinfection was adopted. All the floors and platforms and wooden mats of the surface cars are scrubbed with a solution of bichloride of mercury, made by dissolving sixty grains of the bichloride and a tablespoonful of common salt to the gallon of water. This solution remains on the floor overnight, and every third day the process is repeated.

Once a week the steps and landings of every elevated railroad station are scrubbed with a 5 per cent solution of carbolic acid in water, and afterward with a 2½ per cent solution of soft soap. Wooden slats were ordered to be substituted for cocoa mats, on the floors of elevated cars, and treated in a manner similar to surface cars.

The cabin floors and decks of ferry boats, where occupied by passengers, are cleaned every hour by sprinkling with carbolized sawdust, and thorough sweeping. The sweepings are burned in a furnace.

The REVIEW is indebted for this information to the kindness of Dr. Emery, commissioner of health, and Dr. E. H. Wilson, chief of the bureau of bacteriology and disinfection, of the city of Brooklyn.

ELECTRIC vs. HORSE TRACTION ON NORTH CHICAGO STREET RAILROAD.

The conversion of the North Chicago Street Railroad Company's lines from horse to electric, affords a good opportunity to compare expenses under the two modes of traction when operated on a large scale. The earnings of the nineteen horse lines in 1893 were \$1,032,037, the expenses, \$701,538, or 70 per cent. Figuring operating expenses with electric power at 50 per cent, the net earnings will be, with the same traffic, \$516,000, as against \$331,000 with horse power. The operation of these lines with electric power will thus increase the net earnings sufficiently to increase the annual dividend on the company's stock by nearly four per cent. The rapid transit coming with the electric cars, will largely increase the number of passengers, and will also enable the company to compete with the two steam roads in the northern and northwestern suburbs.

TO STIMULATE WINTER TRAVEL.

The Aurora, Ill., Street Railway Company has prepared a special issue of coupon books, which contain 100 rides. One book sells for \$4.25; three books, \$12; five, \$18; ten, \$35. Each book is only good for the individual to whom it is issued, but any number of persons may purchase books together at reduced rates. When covers are returned they have the following values: 25 cents, if presented within 90 days from date of purchase; 50 cents, within 60 days; 75 cents, within 30 days. The experiment, if satisfactory until April 1, will be continued.

The object of these coupon books is to stimulate winter travel, which on a great many roads shows a falling off from the figures of the summer. This plan on its face presents many advantages to the purchasers, but in order to secure them they must ride a great deal more than they believe necessary, when they buy. For instance, if one of a party of ten buys tickets, he pays \$3.50 for a book, which if it is used up and the cover returned to the office of the company within thirty days from date of purchase, entitles him to a rebate of 75 cents on a new book. This gives a rate of a single fare for the second book of 2¾ cents, but in order to secure it, he must either buy ten books, or find nine persons to buy with him, who, unless they are in the same situation, are compelled to pay \$3.50 for a book. This rule also operates with reference to the other combinations of tickets.

The plan, if properly pushed, ought to be of great advantage to the roads of all cities outside of the large metropolises. In order to be of value, however, it must be pushed, and efforts made to sell the tickets the same as merchandise. The principal benefit to the companies will be the ready cash in advance, and more patrons for the cars, who might otherwise be inclined to forget that there was such an institution as a street railway company in the community.

LITIGIOUS EMPLOYEES WORSTED.

James Cusick, a conductor, brought suit against the Omaha Street Railway Company for \$10,500, alleging that while operating a snow plow, February 27, he was crushed between the plow and the motor, which was not properly equipped. The court dismissed his suit and made him pay the costs.

Conductor Meehan, who was suspended by the Consolidated Traction Company, of Newark, N. J., for retaining fares, brought suit against the company to recover his deposit of \$20. Meehan admitted he had failed to turn over 450 fares which he had collected, alleging that the fares were in some way mislaid. Judge Henry granted a non-suit on the ground that the conductor was responsible for the fares until placed in the hands of properly authorized collectors of the company.

CARS DESTROYED IN TRANSIT.

Seven trolley cars were recently crushed on the Port Richmond branch of the Reading Railroad, while in transit to the Electric Traction Company, Philadelphia. They were loaded on flat cars. As the train passed under the Pennsylvania Railroad bridge at Sixth street, in Philadelphia, the woodwork under the bridge floor caught each car, breaking the glass, forcing the sides down, and tearing the roof off several. The train hands were not aware of the accident until the train had passed from under the bridge. Their hindsight was better than their foresight, but less profitable, for the railroad will have to make good the damage to seven cars.

NATIONAL ELECTRIC LIGHT CONVENTION.

Cleveland, O., will entertain the National Electric Light Association on February 19, 20 and 21, 1895. The headquarters will be the Hollenden house. Meetings will be in Army and Navy hall. This is the eighteenth

annual convention of the association, and these events are eagerly looked forward to by those who have attended any of its predecessors.

PROGRESS IN SAN FRANCISCO.

On November 29 the extension of the San Francisco & San Mateo Electric Railway to Golden Gate Park was opened. Transfers are given to all parts of town and a large traffic is expected, chiefly from pleasure parties. A bid is also made for the park traffic by the Market Street Railway, which has arranged with the California Street Cable Railroad to carry passengers thither for five cents. The Metropolitan Railway Company will also transfer from its electric cars to the steam road running to the park. Mr. Stein, of the Market Street Railway, states that the two steam roads are to be changed to electricity.

SOME MILWAUKEE REPORT BLANKS.

General Manager C. D. Wyman, of the Milwaukee Street Railway, uses a couple of daily report blanks

MILWAUKEE STREET RAILWAY CO.

GENERAL SUPERINTENDENT'S REPORT

OF OPERATION FOR.....THE.....DAY OF.....18

CARS RUN					
LINE	REGULAR	EXTRA	LINE	REGULAR	EXTRA
National Ave. and Walnut St.			Vliet St.		
Greenfield Ave. and Third St.			Wisconsin and Twelfth Sts.		
Muskego Ave. and Center St.			Wisconsin and Wells Sts.		
Broadway and Chestnut St.			Wisconsin St. and Merrill Park		
Russell Ave. and Holton St.			Wisconsin and State Sts.		
Farwell Ave. and Union Depot			Clybourn St.		
Mitchell St. and Cambridge Ave.			Whitefish Bay		
North Ave. and Lakeside Park			Wauwatosa		
Howell Ave.			National Ave. Extension		
(Closed, black) (Open, red)		TOTALS.		TOTALS.	
GRAND TOTAL					
EXTRAS USED FOR					
CHARTERED CARS TO					
DELAYS ON	LINE	CAUSE	TIME STOPPED		
REPORTED ACCIDENTS					
CARS DISABLED					
TRACK WORK					
INSPECTOR'S REPORTS					
EMPLOYEES DISCIPLINED					
GENERAL REMARKS					

Superintendent.

MILWAUKEE STREET
RAILWAY CO

ELECTRICAL DEPARTMENT.

DAILY REPORT for the day of 1894

RAILWAY PLANT AND LIGHTING PLANT.

Average Output Railway Plant Amp Volts Average Output Illuminating Plant Amp
Fuses blown on Feeder No at o'clock, Replugged at o'clock, Cause

ACCIDENTS.

REPAIRS.

GENERAL REMARKS.

OPERATION.

OVERHEAD SYSTEM

Trolley break at Time Delayed Cars Cause

ACCIDENTS

REPAIRS.

GENERAL REMARKS.

CONSTRUCTION.

OVERHEAD SYSTEM

New Work being done at

GENERAL REMARKS.

UNDERGROUND SYSTEM

Service Connections made at For Remarks

ACCIDENTS.

REPAIRS.

REPAIRS MADE TO BONDING AT

GENERAL REMARKS.

UNDERGROUND SYSTEM

New Work being done at

NEW BONDING DONE AT

GENERAL REMARKS.

ELECTRICIAN.

REPORT ELECTRICAL DEPARTMENT—MILWAUKEE STREET RAILWAY COMPANY.

which enable him to see at a glance what is going on in the various departments. The sheets, which are shown here in condensed form, are about twenty inches long and eleven wide. About six blank lines are under each item, which are not shown here on account of a lack of space. In addition to these, a curve, showing the output of the power stations, is submitted each day.

IMPROVEMENTS AT SAGINAW.

The Consolidated Street Railway Company, Saginaw, Mich., has accepted its franchise. W. J. Hart, general manager, writes that \$200,000 will be at once used in improvements. Wiring has been begun. A power house is being built, which will be supplied with three Wickes' tubular boilers, and three Westinghouse 200-horse-power generators. Rails will be laid on the old line next spring.

J. H. FRESH, general superintendent of the Lombard & South streets division of the Electric Traction Company, Philadelphia, has resigned, to take a needed rest. Charles Whiting succeeds him.

The office of the Buffalo, Bellevue & Lancaster Railway Company, is now at Bellevue, Erie county, New York, where all communications should be addressed. Only the treasurer's mail should go to Buffalo.

A stockholder in the Cincinnati, O., Street Railway was recently summoned as juror in a damage suit against the company. He was challenged for cause by plaintiff's attorneys, but the court overruled the challenge, holding that every taxpayer would have to help pay a judgment obtained against the city or county, yet this was not considered good cause to prevent their serving on a jury.

The Sedalia & Brown Springs Railway Company, Sedalia, Mo., will build 2 1/2 miles of electric road to reach 120 acres of fine land, which has two medicinal springs. A health and pleasure resort will be constructed. The officers of the company are W. C. Sterne, president; D. C. Metsker, secretary, treasurer and general manager and purchasing agent; Charles Carroll, superintendent. The line will be built, leased and operated by the Electric Railway, Light & Power Company, Sedalia.



Interesting Bits of Information from all Parts of the Country,
Boiled Down for Busy Readers.

THE Metropolitan Traction Company, New York, declared a dividend of $1\frac{1}{2}$ per cent.

N. W. Sensenly, Bloomington, Ill., is in charge of the Lincoln, Ill., Street Railway Company.

THE effect of the summer resort can be continued during the winter, by building a skating rink.

THE West Chicago Street Railway Company, has declared the usual quarterly dividend of $2\frac{1}{4}$ per cent.

THE Marquette (Mich.) City Railway Company, creates Sunday travel by reducing fares to Presque Isle.

JAMES STEWART & Co., Buffalo, N. Y., are building the \$40,000 power house of the Syracuse Street Railway Company.

THERE is a suit against the Electric Traction Company, Philadelphia, because a stationary register fell on a man's head.

THE Freeport Electric Railway, Freeport, Ill., has bought a 150-horse-power engine from the Ball Engine Company, Erie, Pa.

THE Montreal Street Railway Company is running 112 motor cars and 49 trailers. This is twice as many as were run a year ago.

THE People's Traction Company, Philadelphia, will establish and maintain a grass plat between the double tracks on one of its lines.

THE Scranton, Pa., & Pittston Traction Company, has completed its line from Greenwood to Moosic. Plumber S. Page was the contractor.

JAMES F. DOLAN is constructing the extension of the Geneva (N. Y.) & Waterloo Railway Company, to Border City. Cars are running.

WHILE a lady was attempting to board a car in Chicago, she was surrounded by a crowd of newsboys, who picked her pocket. This is a new game.

THE Newburyport Car Company's plant, Newburyport, Mass., was burned. The loss was \$20,000, and was confined to the setting up shop and office.

THE Consolidated Traction Company, Orange, N. J., has rushed through its change of gage, from 5 feet $2\frac{1}{2}$ inches to 4 feet $8\frac{1}{2}$ inches, with wonderful energy.

THE Trumbull Electric Railroad Company, Warren, O., has utilized the trucks of one of its open cars in making a gondola to haul cinders for repairing its track.

THE Goodwin Car Company, Chicago, has been incorporated with \$2,000,000 capital, by John M. Goodwin, 2805 State street, Joseph J. Koehle and G. Fred Rush.

W. A. SIMMONS, Washburn, Wis., is electrician of the Quincy Horse Railway & Carrying Company, Quincy, Ill., in place of I. L. Faucett, who has gone into the electrical business.

THE City Passenger Company, Baltimore, is building a \$30,000 car barn, 75 x 700 feet, with capacity for 50 cars. Adjoining will be repair shops. J. H. and J. F. Adams are the builders.

THEY had a great time in Muncie, Ind. An asphalt paving company interfered with traffic on the electric line, by blockading it with teams. Motor cars were effectively used as battering rams to clear the way.

"It's an ill wind that blows nobody good." Trolleys have brought down the values of horseflesh, but make work for the shoemaker. Action on the gong causes the right shoe to wear twice as fast as the left, and shoemakers are kept busy.

SECOND ASSISTANT POSTMASTER GENERAL NELSON has been giving a great deal of attention to special mail service in large cities. He has ordered maps prepared showing all surface lines with a view to having mail cars run over the electric and cable lines.

FARES have again been reduced to 5 cents by the Allentown & Lehigh Valley Traction Company, which tried 10-cent fare for a month, but found it did not pay, and President A. L. Johnson says he would rather carry twenty persons for a dollar at 5 cents than ten at a dime.

THE New York Herald remarks about the Fourteenth street curve of the Broadway Cable that, "it is only at that curve that the cars go at their highest speed, for here the curve takes all the 'slack' out of the cable, and it flies past with awful velocity," all of which shows how little the Herald knows about such things.

A passenger on a Sixth avenue surface car, New York, pulled a strap to indicate that he wanted to get off, ringing up five fares. The conductor took a package of books as security and the passenger snatched the conductor's hat as security for his books. The police magistrate dismissed both with a reprimand.

THE Equipment Construction Company, Batavia, N. Y., has been incorporated with \$10,000 capital to make and sell all kinds of railroad supplies and equipments, dynamo and electrical appliances, rails, cars, engines,

motors, etc., by Montgomery H. Johnson, Thomas P. Nightingale, Utica; Lina Beecher, Charles A. Seaver, Joseph W. Holmes, Batavia.

WE are indebted to J. B. McClary, superintendent of the Birmingham Railway & Electric Company, Birmingham, Ala., for a neat pocket time table. The road has four divisions in addition to its city lines. A feature of the folder, which is $1\frac{3}{4}$ inches by 4 inches, is the advertising of points of interest reached by the lines. The fare is 10 cents at 9 p. m., and later. Special cars are hired at any time.

In a recent damage suit against the Rochester Railway it was decided that an old ordinance regulating the speed of street cars to seven miles an hour was still valid. The case has been appealed, and President J. N. Beckley is trying to get an amendment to the ordinance. A strict adherence to the old ordinance would give the people a taste of rapid transit that would help the amendment decidedly.

A California paper, regretfully announcing that a well-known citizen was about leaving town, says: "Mr. Allen has been a faithful street car conductor for five years. Failing health, the result of a monotonous occupation, is the reason for his giving up the job." Probably if Mr. Allen had indulged in the athletic exercise of an occasional "knock-down" he would not have found things so "monotonous."

The McKeesport & Wilmerding Railway, of McKeesport, Pa., is now using a portable fare box instead of a fare register. The boxes are carried by the conductors and the passengers put in their fare themselves. The conductors furnish change, but are prohibited from putting fare in the boxes. The boxes open at the bottom by a lock and key, and their contents are, of course, inaccessible to the conductors.

SNOW FENCES ON INTERURBANS.

H. M. Sloan, superintendent of the West Superior (Wis.) Rapid Transit Company, is following the example of steam roads, and has erected several miles of snow fences along interurban lines. The city of Superior is divided into three parts—East, West and South Superior. The territory between is thinly settled, and there is, consequently, a good deal of unprotected track. The topography of the country is flat as it is on the lake front, and when a northeaster comes in off the lake there is trouble from drifting snow. The fences had to be placed on private property, as the right-of-way is entirely along the streets. The only rule used in setting them was to put them at points where the snow was known to drift on previous occasions.

Ralph G. Calef is treasurer of the Newburyport & Amesbury Street Railway Company, Newburyport, Mass.

PERSONAL.

Howard S. Baker is receiver of the Sioux City Cable Railway Company.

W. B. Faben, is manager of the Defiance Light & Power Company, Defiance, O.

J. R. Beetem has been appointed general manager of the Scranton Traction Company, Scranton, Pa.

W. D. RAY, Chicago, has been appointed superintendent of the Everett (Wash.) Railway & Electric Company.

F. L. HART, New York, succeeds A. N. Connett as superintendent of the City Passenger Railway Company, Baltimore.

MISS MAY ROTHERMELL is secretary of the Citizens' Street Railway Company, Kalamazoo, Mich., instead of E. E. Downs.

Sidney H. Short, of the Walker Manufacturing Company, favored the Cleveland Electric Club with a talk, at a recent meeting.

C. C. FULTON is the new superintendent of the Pasadena & Los Angeles (Cal.) Electric Railway, with headquarters at Pasadena.

A. J. NELLES has been appointed general manager of the Hamilton, Grimsby & Beamsville Electric Railway Company, Hamilton, Ont.

Edward F. Tindolph, of the Vincennes Citizens' Electric Street Railway, was united in marriage to Miss Lucille Roush, of Vincennes.

JAY CHAMPLAIN is general manager and William G. Duntz, assistant manager and electrician, of the Ossining Electric Railway Company, Sing Sing, N. Y.

Silas Owen has been elected secretary and a director of the Cohoes City Electric Street Railway Company, Troy, N. Y., in place of Thomas O'Day, resigned.

RUSSELL B. HARRISON, who has been so successful with the lines in Terre Haute, Ind., has also assumed the presidency of the Lake Cities Electric Railway, of Michigan City, Ind.

M. S. Patterson has been elected general manager of the Lock Haven Electric Railway Company, Lock Haven, Pa. He is selecting employees, and the line will soon be in operation.

S. R. Smith has been elected general manager of the Watertown & Brownsville Street Railway Company, Watertown, N. Y. Mr. Smith was at DuBois, Pa., for a year. The Watertown road is twelve miles long, and twelve miles will be built.

EMPLOYEES' READING ROOM.

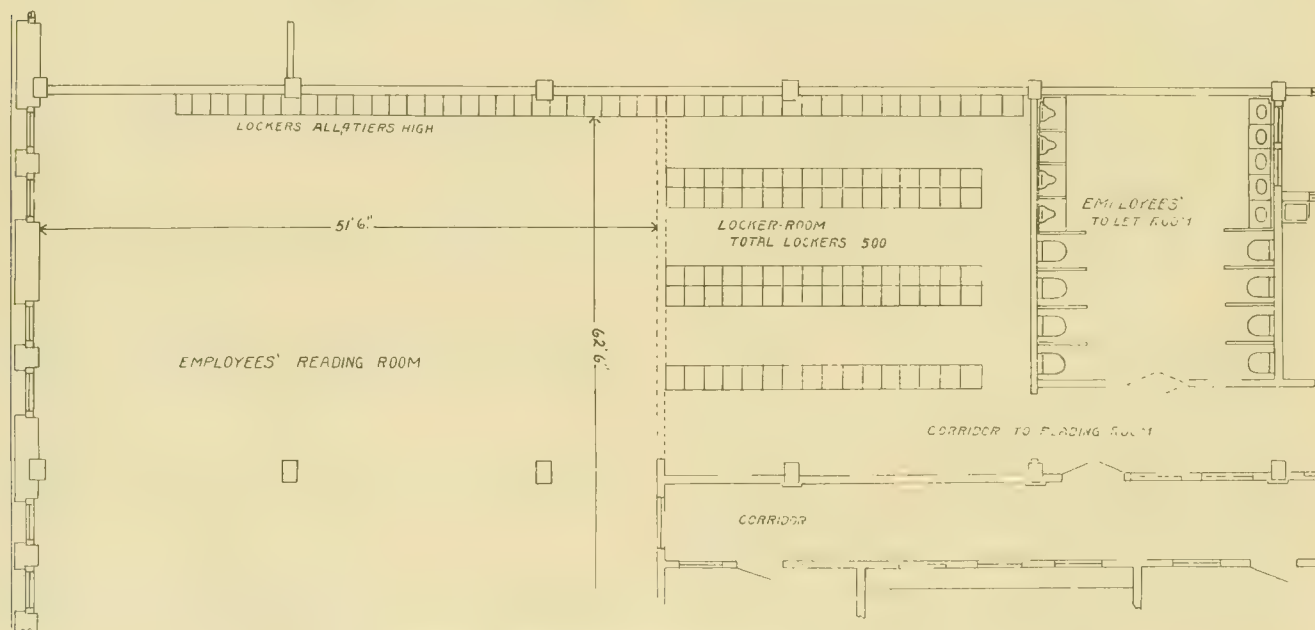
PART I.

Managers of street railways in large cities are giving much attention to the comfort of employes when off duty. The simplest and most attractive way, perhaps, is the establishment of a reading room, neatly and comfortably furnished, to attract the men, while for their entertainment is provided an ample supply of good, wholesome literature, selected to suit all tastes. Some of the larger systems have rooms fitted up at each of their barns, so satisfactorily has the plan worked in its experimental stage.

The expense is not great. All that is necessary is to fit up a light room with easy chairs and a table or two, with plenty of periodicals. The reading rooms keep the men surrounded with good influences, while the class of

The rooms for employes are to be on the second floor of the new building, the remainder of the floor being used as offices of the superintendent, paymaster, time-keeper and register clerk, superintendent of cable, accident clerk, general office and supply rooms. A corridor separates the employes' room from the offices, and inside the employes' space is a private corridor for their exclusive use, with doors opening into the toilet room and locker room. The reading room is 51 feet 6 inches wide and 62 feet 6 inches long, with many windows and light on two sides.

This room is designed for a reading and waiting room, which will be furnished with chairs and tables, the latter being supplied with the daily newspapers and other reading matter of an interesting character. Facilities for playing checkers and other games not objectionable will be furnished. The rooms will be equipped with individual lockers to hold lunches, caps, overcoats and othe



PLAN OF EMPLOYEES' READING ROOM—METROPOLITAN STREET RAILWAY COMPANY, NEW YORK

reading that is furnished them has a tendency to elevate their minds. The reading room also makes them more loyal to the company, for they see that it is endeavoring to do something for them, and no matter what differences of opinion may arise, there will always be a strong sentiment that the company would not do thus and so unless it was absolutely necessary, for it had invariably shown great interest in the men working for it.

The Metropolitan Street Railway Company, New York, is so firmly convinced of the importance of providing a reading room for its men that it has planned a special room in its new building, now in process of erection at Fiftieth street and Seventh avenue, of which we are able to show a plan. The Broadway division has heretofore provided at the depot, at Seventh avenue and at Fiftieth street, as commodious accommodations for its employes as the condition of things would allow. The new building will enable the company to make many improvements.

belongings of the men. Gas stoves will also be provided, on which they may warm their lunches or prepare tea and coffee. H. H. Vreeland, president of the company, writes: "The arrangements contemplate ample facilities for 'extras,' as well as 'regulars,' so as to meet all emergencies, and so contributing to their comfort and convenience that there shall be no necessity or excuse for frequenting neighboring saloons, which arrangements it is confidently believed will be advantageous to both employes and employers."

The inspectors, superintendents, clerks and engineers have organized a club, which has 100 members, gripmen and conductors being barred. Papers on street railway subjects will be read at the meetings. The club may put in a restaurant, baths and a gymnasium.

The West End Street Railway Company, Boston, is also a firm believer in the value in reading rooms and reading matter for employes. Several have been established at different places, and included in the literature

supplied is the STREET RAILWAY REVIEW, the company having subscribed for sixty-four copies for its reading rooms.

A REPORT FROM THE LOVE CONDUIT AT WASHINGTON

In accordance with the expressed desire of several railway men to hear something of the more recent working of the Love conduit road at Washington, D. C., the REVIEW has been carrying on an investigation as to the record of the road since the report of its electrician, M. D. Law, at the Milwaukee convention, in the fall of 1893. The results of the investigation show that the road is neither a remarkable success nor a flat failure. In introduction it may be said for the benefit of those unacquainted with the Love system and its history that the first track laid on this plan was in Chicago, on the North Side, in 1892. This was operated intermittently for a year or two, but is now given back entirely to horse cars. The mechanical details were very imperfectly worked out on the Chicago road, and the promoters were the wiser from experience when they went to work at Washington. The conduit is almost identical in construction with a cable conduit. The two conductors (it is a double trolley system) are ordinary trolley wires hung close up under each slot rail. The Washington road is a mile and a half long, and level. There is one curve. It has been in operation twenty-one months. Cars are run over it on a fifteen-minute headway.

In the past year there have been no less than six stops of considerable length, due to trouble in the conduit. In the summer of 1893 the insulators were changed, and this of course made several hours delay. A molded mica insulator is now used. It is mainly due to the clips that the six or more serious stops during the year have occurred. The greatest source of trouble has been the expansion and contraction of the trolley wires. The wisdom of the General Electric Company in using channel irons for conductors in the Lenox avenue conduit at New York is apparent. Not only does the contraction and expansion of the wire with changes of temperature make trouble, but the action of the trolley wheels on the clips and hangers in a conduit is similar to that on a center pole construction, where the hangers are rigidly attached to the brackets. In some cases in the conduit the burning which took place at the clips has caused the wire to drop. Three stops of not more than two hours each have been caused by this. Kinking of the wires has also caused some stoppage. Slight delays have frequently been caused from the fact that if one of the insulators has a slight defect it is not easily accessible. Before an insulator can be reached a section of the slot has to be taken up, and this takes considerable time. It is proposed to remedy this by placing a cap over each insulator, which can be removed more readily than a portion of the slot. The wire is also so defective that it is proposed to replace it with a new one. The wire is laid in sections of 500 feet. A few sections of new wire

have been already put in. The new wire is larger than the old. A frequent source of annoyance and delay is the opening of the circuit breaker in the power house. Whether this is from sudden momentary grounds in the conduit or on account of the circuit breaker being defective we do not know. The road made as good or better a record during the winter than during the summer. During the summer four stops were caused by the clips burning off and the wire dropping. Two more stops of half an hour or less were caused by the kinking of a wire near an insulator. Several stops of half an hour or less have resulted from grounds. There has been little trouble from moisture, the main difficulties being mechanical, as was said before. With a heavy traffic there is reason to believe that even more mechanical breakdowns would occur within a given time. It is encouraging to note the absence of electrical troubles, as it goes to show that possibly 500 volts pressure can be safely used on underground work in crowded cities. As pointed out editorially in our December issue, there might be some field for an underground system in our large cities, provided that 500 volts could be used on the underground work, so that a uniformity of apparatus could be maintained on both underground and overhead lines. With installation as costly as cable and operating expenses much higher, the field seems at present limited to places where it is desirable to use electricity, where overhead wires are prohibited. The general adoption of a conduit electric system is still in the far distant future.

HERE IS A RARE BARGAIN!

Information is at hand from a road in Woodland, Cal., that is looking for a purchaser. The REVIEW sends out a printed form to managers for facts concerning their roads, and the following replies were received from the road in question:

State—*California*; City—*Woodland*.

Name of Road—*Woodland Street Railway*.

President—*Dr. Thomas Ross*. Secretary—*L. W. Hilliker*.

Treasurer—*Bank of Yolo*.

General Manager—*M. McCutchen* (the driver).

Superintendent—*Have none*. (Lawson former superintendent sold out.)

Purchasing Agent—*We don't purchase anything*.

Miles—*One*. Gage—*3 feet*. Pound rail—*30 pound T*. Horse cars—*3*. Horses—*3*.

Remarks—*This property is for Sale. The way it is run it will never pay. The stockholders are bent on selling out. I have it for Sale at a wonderful Sacrifice. Can be had at almost any price. Dont want to subscribe for Review. Dont want by anything. Stockholders are determined to get out of R. R. business. Send me a buyer by return mail. Respectfully, J. D. Lawson, ex-sup.*

A. F. Gerald has resigned as president of the Waterville and Fairfield Railway and Light Company, Waterville, Maine.



Cape Town, Africa, is to have an electric railway at a cost of \$500,000.

The Auckland, New Zealand, public are all torn up over the question of Sunday cars.

The Rouen, France, street railway company will convert its lines from horse to electric power.

A street railway franchise has been granted in Bombay, India, for a double and a single track road.

The trolley lines in Belgrade, Servia, have been purchased by a Belgian company with \$680,000 capital.

Nicolaieff, Russia, is soon to have a street railway, proposals to build one having been accepted by the municipality.

The Allgemeine Elektricitats-Gesellschaft has entered the traction field in earnest, and is doing a large amount of German business.

A conduit electric railway is being experimented with in Turin, Italy, at the works of Tedeschi & Co. The inventor is Alfredo Diatto.

Metallic seating, made of steel rings knit together and tightly stretched, is being tried on the North British Railway. The great advantage of this material is its durability.

Madrid, Spain, is soon to have its street cars operated by electricity, plans for the change having been furnished by the Allgemeine Elektricitats-Gesellschaft of Berlin, Germany.

The Hawaiian Tramway, Sandwich Islands, shows a decrease in business for its fiscal year of \$3,000, although 35,000 more passengers were carried and 23,000 more miles run than in '93.

It is announced that the franchise for the construction of an electric tramway at Cairo, Egypt, has been awarded to a Belgian syndicate. It is to be hoped that at last the Cairo tramways will materialize.

As illustrative of the away back ideas of street railroading abroad, it is only necessary to state that an Isle of Man inventor has devised a car starter for which he claims to have refused \$45,000, but is holding for \$150,000. Might as well hold for a billion.

The trolley line built in Plauen, Germany, by the Allgemeine Elektricitats-Gesellschaft has recently been placed in operation. It connects two railway stations lying at opposite sides of the town.

The experimental cable tramway in London, Eng., has operated so well that additional lines will be laid by the same company. Contracts for construction have been entered into with Dick, Kerr & Company, Limited.

The Newcastle City Corporation, England, is considering plans to introduce cable traction in place of the present horse lines. The corporation has applied to the Local Government Board for power to borrow money for the proposed change and extensions.

We learn with surprise in "Lightning" of London that the Chicago City Railway ran sixty-one motor cars on Chicago Day, October 9, 1893, and that the maximum current at the station was 17,000 amperes!! The addition of an innocent little cipher sometimes gives astonishing results.

The Mekarski compressed air system has been adopted on three lines in Paris, France, operated by the General Omnibus Company. These lines aggregate twenty-four miles in length. The longest extends from the Louvre to Sevres and Versailles, a distance of twelve miles. Trains consist of three cars, drawn by a compressed air locomotive.

Christiania, Norway, is pleased with its first electric street railway. The company has applied for concessions, permitting extensions to Hanshangen and the operation of electric ferries between Skarpsno and Bygdo. The Christiania horse railway has asked permission to install electric in place of horse power, and to construct three extensions and two new electric lines.

Tram cars are no respecters of persons. The Grand Duke Michael, of Russia, was driving down a hill at Cannes behind a tram car. Unmindful of his distinguished person, the car stopped just as if he was a peddler or drayman. The Grand Duke's horse not being as skillful as plebeian horses in such matters, was unable to stop and ran into the car. The horse had to be killed, but the Grand Duke escaped with only a little dust on his clothes.

Among numerous projected electric roads in Germany are: One from Cassel to Wilhelmshohe; one in Zwickau; one through Eisenach, and up the Wartburg; one at Munich, from Farbergraben to Iserthal; one at Dresden, from Laubegast to Kleinschachwitz; one from Antomenhutte to Morgenroth, Godullahutte, Schomberg and Beuthen; one to connect Konigshutte, Heiduk, Zalenze, Kattowitz, Laurahutte, Rosdzin and Schoppinitz; and one in Bamberg, promoted by the Allgemeine Elektricitats-Gesellschaft.

ADOLPH SUTRO.

Adolph Sutro, mayor of San Francisco, is, perhaps, the most unique character in America to-day. Although rated as many times a millionaire, he was elected on the Populist ticket by a large majority over five other candidates on account of his sympathy with the people. His fine estate, Sutro Heights, on which he has constructed the most beautiful, and, perhaps, the largest baths in the world, is thrown open to the people, who are permitted to enjoy the beautiful gardens, with statuary and everything else that lavish wealth can supply to a man of artistic taste.

Mr. Sutro is numbered among the street railway fraternity, for he is building an electric road to reach his estate, and to give the people the benefit of a five-cent fare. The reason for the new road was the refusal of the other lines to reduce fares from ten to five cents, which has since been done. On account of the many attractions at Sutro Heights there is a large crowd of visitors, especially on pleasant Saturdays and Sundays, when music is furnished by a high class orchestra. All of these things serve to develop travel in that direction, while in times when there is nothing going on, few passengers are carried.

Adolph Sutro was born at Aix-La-Chapelle, April 29, 1830, being one of eleven children. In his early youth he manifested natural aptness in mechanical matters, devoting a large portion of his leisure to studying the machinery in his father's cloth factory.

On the death of his father, in 1847, Mr. Sutro and a brother conducted the business until 1848, when the revolution broke out, ruining all kinds of business. Mrs. Sutro decided that Europe was no place for her young family, so she brought them to America, founding

a new home in Baltimore. When gold was discovered in California Mr. Sutro determined to seek his fortune. For nine years he had a hard struggle, without accumulating much wealth. About that time the famous Comstock lode was discovered in Nevada, which Mr. Sutro visited. Then he conceived the idea, which, when worked out, was destined to make him wealthy and famous. His mechanical aptitude, together with his scientific studies, enabled him to foresee the possibilities of a great mining development, and he began to develop the plans for the great Sutro tunnel. Before he got to work on the tunnel, however, he improved the amalgamation process for reducing silver ore, which was a financial success.

The Sutro tunnel was an immense undertaking, which brought forth many difficulties that had to be overcome. Finally, when the tunnel was completed, the mine owners would not keep agreements they had made, and Mr. Sutro, by a masterstroke, brought them to terms. During these years of discipline his ability as a man of resources was given its foundation and education, which has stood him so well in his fight against abuses, against which he has placed himself. The tunnel made him a millionaire. He invested largely in real estate in San Francisco, which had apparently little value, but which his foresight told him was bound to be in demand in a short time. His judgment has proven him to be correct, for the increase in values has brought him his present fortune, which he is using so that those less fortunate than himself may

enjoy the beautiful things he has collected for his own pleasure.

On Christmas Day, the Cliff house, which was on Mr. Sutro's estate, burned, causing a loss of \$20,000. The fire was a hot one and came nearly spreading to the



ADOLPH SUTRO.



MOST COSTLY BATHS IN THE UNITED STATES.

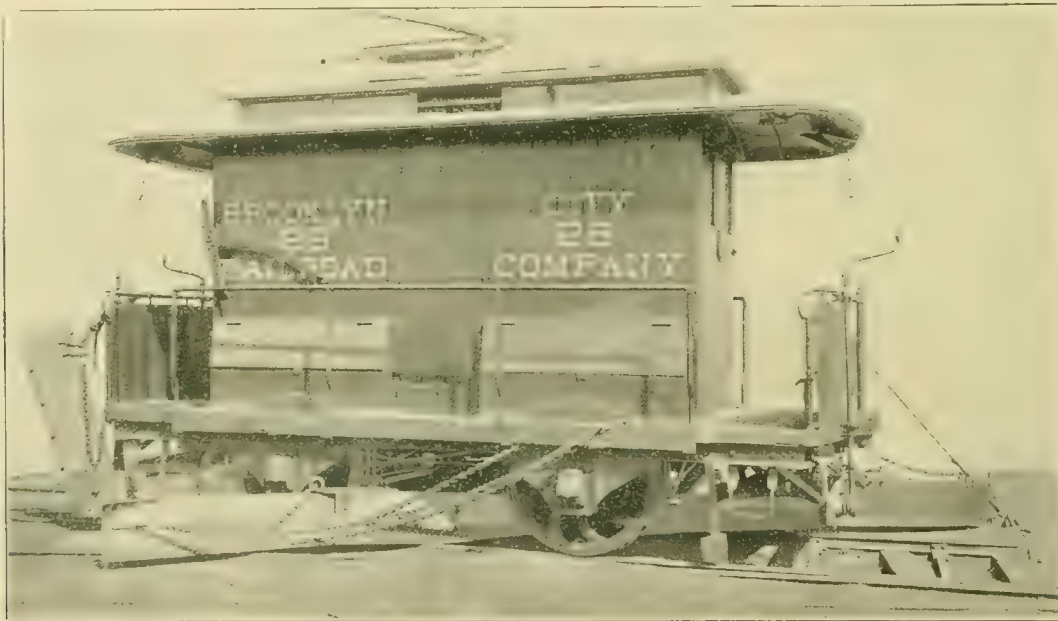
magnificent baths, which were not far away. The Cliff house had a world-wide reputation, as it over looked the seal rocks, where the seals played in the water, greatly interesting visitors from all parts of the world, who for thirty years never left San Francisco without visiting the Cliff house to view the sports of the gentle and useful seals, who are very awkward on land, but lively and graceful in the water.

Mr. Sutro's famous baths, which have created so much travel for street railway companies, and will continue to do so as long as they last, deserve a few words of description. The building overlooks the ocean and is made chiefly of glass, there being 100,000 square feet of glass in the structure, which has a frontage of 350 feet on the ocean. It is brilliantly lighted at night by electric light, and it is so large that it can accommodate several thou-

almost as elaborate as the intake, for by means of a system of piping all refuse water is emptied at a point where a tidal current takes it out of reach of the baths. The ocean side of the building is so constructed that the rush of water from any tidal wave that might be bent on mischief will force open the panes of glass in the side of the building and go through the building without causing any damage. Truly there is nothing like the Sutro baths anywhere in the world.

WHITE'S STEEL SNOW PLOW.

Snow plows are in great request for about four months in the year, according of course to the latitude and longitude in which a street car line is located. The West End Street Railway Company, Boston, Brooklyn



WHITE'S STEEL SNOW PLOW.

sand persons a day. Seats have been placed for 5,000 persons, while the spacious grounds will easily hold 50,000. There are six tanks, the largest being 275 feet by 150 feet, with depth of water from 2 feet to 7 feet 9 inches. On the other side of the building, separated from the main tank, are five smaller ones 75 by 28 feet, four of which contain warm water. Each dressing room has a shower bath.

Mr. Sutro devised an ingenious method for supplying his baths with a constant supply of fresh ocean water. Observing the height to which the waves came, he blasted a basin in the solid rock of the cliff which forms the shore line, into which the water falls. The waves rise twelve feet, and the overflow runs through a tunnel to an elaborate system of canals, which distribute it automatically by means of gates to the various tanks, as required. There is also an emergency pipe which is capable of bringing in 5,000 gallons of water a minute if the tide happens to be exceptionally low. The outlet is

Heights Railway Company, Brooklyn, and many others, use the style of plow shown in the illustration, which is made entirely of steel, under the patents of L. J. Hirt, by the White Manufacturing Company, 556 West Thirty-fourth street, New York City.

No wood is used except in the cab. The two 25-horse-power motors are hung in an independent cradle inside of the cab, being entirely and thoroughly protected from snow and rain. The construction of the cradle is such that the sprocket chains connecting the motors with the axles can be adjusted on the road while running. It is claimed that by this means breaking of connection and hot boxes are avoided.

Only two men are required to work the plow, one operating the motors, while the other has all the manipulation of the plow shears within reach. Another feature of the plow is the complete walk-around, which makes it easy for the man in charge to walk to any part of the plow without dismounting. In front of the wheels

is a patent digger that cleans the grooves. On account of its New York factory being severely taxed in the building of sweepers and special snow apparatus, the White Manufacturing Company has made arrangements with the Pullman Company, Pullman, Ill., to also build this patent snow plow.

Thus early in the season have been sold forty-eight plows, the New Jersey Consolidated Traction Company buying thirty. Other roads using them are Brooklyn City Railway, 30, Brooklyn, Queen's County & Suburban, six this season, Union Railway, New York, two, Bridgeport Traction Company, two, besides many other smaller roads.

In comparing the action of sweepers and snow plows, the White Company says: "Electric traction on account of the weight of the cars, etc., does not require that the tracks be entirely cleaned of snow, since the car will readily crush and remove ice or snow of about an inch in thickness without effort. Nor is it longer necessary to clean off the pavements so that horses can get a footing, which was and is still the function of the sweeper. The plow, however, will readily remove any accumulation of snow at the expenditure of about one-quarter of power required by a sweeper, which is a very serious matter regarding the station, since, in addition, each car in a snow storm will require considerable more than the normal power, thus overtaxing the station. The sweeper has to lift the snow and throw it, while the plow simply pushes it aside, making a wider path." The company says about 140 of its plows are used in Boston.

SOME EXCELLENT BRICK PAVING.

The Chicago City Railway Company has been putting down a brick pavement on Twenty-sixth street which bids fair to be lasting and durable. The contractor was Clift Wise, Omaha building, Chicago, who finished the job on Christmas eve in a very short time. The foundation was a bed of cinders six inches deep, thoroughly rolled with a five-ton roller. On the cinder was placed a cushion one and one-half inches thick of sand, which was thoroughly tamped, and afterwards a tamper is drawn over it. Three styles of brick were used, all being repressed around the corners. One was the West Virginia paving block of the American Fire Clay Company, Toronto, O., $9\frac{1}{8} \times 4 \times 3$ inches; Purington, $8\frac{1}{2} \times 4 \times 3$ inches, and Canton, $8\frac{1}{2} \times 4 \times 3\frac{1}{4}$ inches. The brick were placed with close joints on the cushion of sand, and sand swept over the top, after which the pavement was cleaned and rolled with a five-ton roller. When the rolling was finished, a quarter-inch of sand was spread over the top, and the pavement was completed. The surface is smooth, while the calks of the horses' shoes find a hold in the spaces between the rounded corners of the bricks. So there is no slipping, and the pavement itself is as solid as a rock.

Mr. Wise has completed the construction of the Atchison (Kas.) Electric road and laid three and a half miles

of brick pavement for T rail construction. The surface of the ground was first leveled and rolled and a course of brick laid flat. On this course was placed an inch of sand, and upon this cushion was laid another course of brick on edge. Mr. Wise also laid one and one-half miles of 7-inch round bois d' arc block, or osage orange which came from Texas, and are very expensive, although pavement laid eight or nine years ago shows little signs of wear. The foundation for this pavement consists of six inches of concrete, with a cushion of sand, on which the blocks are placed, the interstices being filled with gravel and tar.

HOW TO ESCAPE PAYING FARE.

It seems that the way to avoid paying fare on the street cars is to hypnotize the conductor into a state of non-expectancy. The passenger takes on the look of one who has completed a final transaction and thus induces in the mind of the conductor the feeling that he has nothing further to do with that passenger. In other words, he is non-expectant. The passenger assumes the wooden look which indicates entire absence of interest in any proceedings which concern money, meanwhile strongly willing away the attention of the conductor.

It is true, one must be somewhat of an artist in such matters or in the language of the service the conductor will "get on to this wooden look" and wound your sensibilities by over-strenuousness in the matter of demanding fare. He may not understand that it is purely mental exercise, conducted out of pure fun, and that your object is psychical research and not to cheat the company out of the fare. That is, unless you meet the Boston conductor.

Conductor—"Fare, please."

Passenger—"What is the fare?"

Conductor—"It is the tariff or tax levied by the corporation owning and controlling the charter and franchise of this street car line, on those persons who avail themselves of the opportunity afforded them by the company to secure more rapid and agreeable transportation than pedal locomotion."

Passenger—"How much is the fare?"

Conductor—"Five cents, please."

And the passenger produces hoping that the next conductor will be a better subject.

TOOK HIS NUMBER.

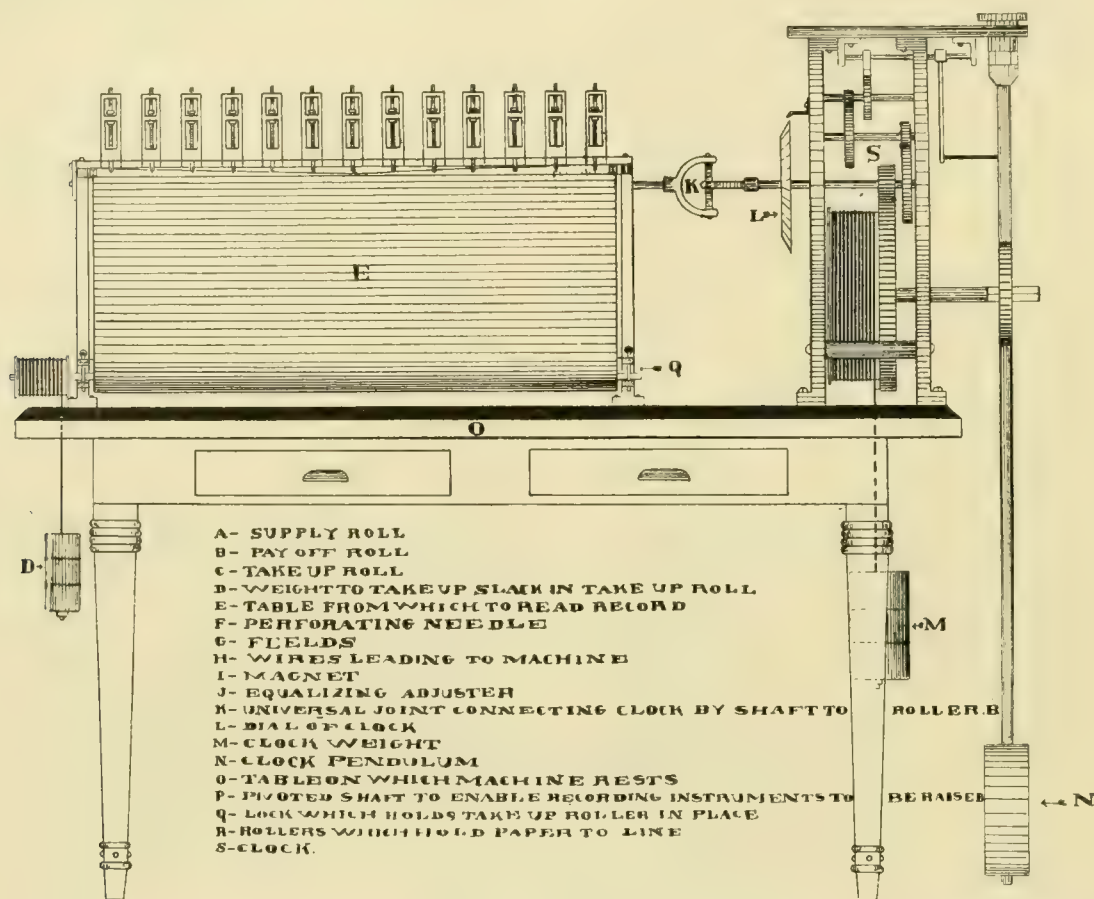
A New York woman got on a Broadway car and while standing up grabbed the bell rope for support. Of course the car stopped. The conductor cautioned her and the car went on. A minute later she clutched the rope again and again the car came to a halt. "Don't do that," again called out the conductor.

"You needn't talk so much about it; I'll report you," replied the offended woman. And then, to the amusement of the passengers she took down his number.

BAUMHOFF'S CAR-POSITION INDICATOR.

There is in operation at the office of George W. Baumhoff, general superintendent of the Lindell Rail-

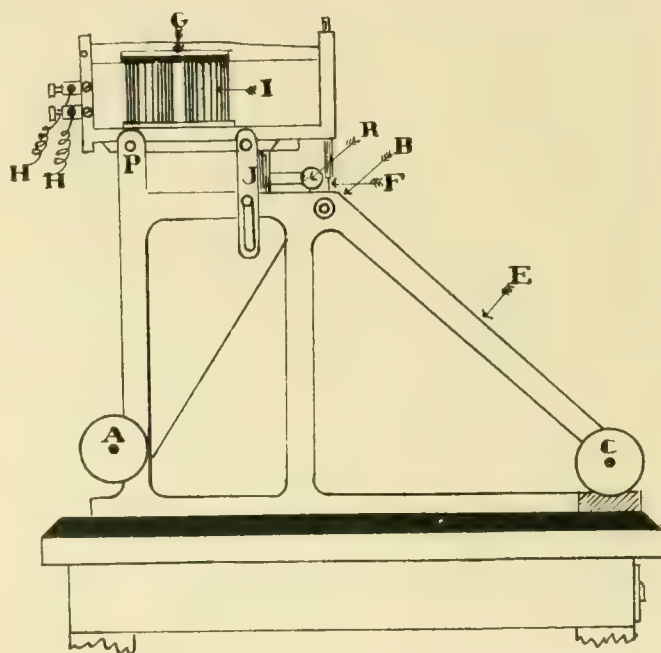
machine. The dots in the paper made by any one punch, of course, indicate the movement of cars past any given point, each dot meaning that a car has passed, and knowing the order in which cars go out, it is easy to tell what



BAUMHOFF'S CAR POSITION INDICATOR.

way, of St. Louis, an apparatus which it is safe to say is unlike anything heretofore used by a street railway manager in keeping a record of the movement of cars. In fact, there has been in the past no mechanical or electrical means of keeping a record of a car as it passes over a route and a check on all its movements. Mr. Baumhoff's method involves the use of a special trolley wire hanger at various points along the road at which it is desired to record the passage of cars. These hangers are arranged so that whenever a trolley wheel passes over one of them it makes connection between the trolley wire and a No. 10 insulated copper wire running to the office. This momentary current passes through a resistance of five incandescent lamps, and is made to record itself on a sheet of paper in somewhat the same way that chronograph records are made at an astronomical observatory. That is, the current which is kept down to a proper amount by the series of lamps, passes through an electro magnet which operates a punch. The punch leaves its mark on a sheet of paper which is passing under it at a fixed rate of speed. The movement of the paper, which is fed from one roll on to another, is regulated by a Seth Thomas clock. The electro-magnetic punches for the various circuits are located in a row along the top of the

time each car makes during a trip. A glance at the sheet shows when and where blockades and stoppages of



ELECTRO-MAGNETIC PUNCH.

any kind or duration occur. Thus the movement of cars is reported directly to headquarters with absolute accuracy, and human nature is not depended on to make reports. The foremen of each division of the road meet the superintendent every day, and are expected to be able to give a full explanation of all blockades of any long duration. The main objection to the device is, of course, that it requires wires to be run to the various points at which records are desired. At the same time the great advantages of having such a record cannot be denied. In practice on the Lindell road the days' record sheet is looked over by a trusted clerk, who makes out a written report of all important delays to the superintendent. The record paper is rolled from one drum to another, the tension between the drums being kept by clock weights and cords. The paper in passing from one drum to another runs over a drum with sharp teeth at the ends. This latter drum is regulated by the Seth Thomas clock mentioned, and it is over this drum that the electromagnetic punches are placed. They work down against this drum, making holes a little larger than a blunt pin prick. While this device may not have a large field of usefulness, it is of value to managers to know what has been successfully accomplished along this line, and there may be several roads that can with advantage employ Mr. Baumhoff's method. Several forms of hanger may be used at the point where the records are to be made. Mr. Baumhoff uses a flat strip of metal stretched between two hangers. The ends of the strip are clamped between the upper and lower parts of a double insulator, and the wire running to the recorder at the office is connected to the metal strips. Alfred Ramel, who is a well known expert on electric timing devices, has been associated with Mr. Baumhoff in getting up this apparatus.

MORE ABOUT OPERATING EXPENSES.

The following communications have been received commenting on the inquiries of "G. E. T." on page 778 of our December number and our answers thereto. They help throw light on the subject in hand, and we would be glad to hear from others:

EDITOR REVIEW: I am interested in your discussion of the car mile as a unit for the measurement of operating expenses, but venture to suggest that the questions of operating expense and car service cannot be separated. Possibly the car mile is the best unit to be found, but it is certainly a very poor one, as an analysis of the expense account will show. General expenses, though affected by varying local conditions, should be nearly proportionate to car miles run, except that the percentage must increase on small roads. Transportation or traffic expense also should be proportionate to car miles run. But into the power account must enter other factors, such as weight of cars, grades, and length of line. Maintenance of equipment is also affected by grades, and maintenance of way, instead of being proportional to car miles, is proportional to length of track, a very different matter.

On interurban lines, where service is much less fre-

quent, fares must be higher in order to cover the greater maintenance of way expense and larger interest charges. On such lines there is less opportunity for inducing greater traffic by increased car service than on city, or even suburban lines. The manager must adjust his car service at the point where to increase it would increase expenses more than earnings.

As a case in point, a road operating eight cars over 16½ miles of line (single track, with turnouts) operates for less than 60 per cent of earnings, though expenses are between 15 and 16 cents per car mile. The same policy which results in so moderate a percentage of expenses also makes the car-mile expense high, for it is a policy adjusting car service closely to the traffic. In the operating expense of this road the items of power and maintenance of way are the ones that are higher than the average.

While it is true that no manager would put on more cars just for the sake of reducing expenses per car mile, I must agree with "G. E. T." in so far as to admit that a manager who was imbued with the car mile idea might fail to reduce service and so increase expenses per car mile, when by so doing the net earnings would be increased.

T. C. F.

EDITOR REVIEW: In connection with your very able reply to inquiries of "G. E. T." in the December REVIEW regarding the operating expenses of the Beaver Valley Traction Company, I wish to call attention to the fact that my figures on the cost per car mile began with the month of July, 1893, and had nothing to do with the period of time for which "G. E. T." claims the operating expenses of this road amounted to 70 per cent of the gross receipts—namely, the year ending June 30, 1893, of which (careful?) quotation "a verification may be had in 'American Street Railway Investments.'"

When he next reads, "American Street Railway Investments," perhaps he will find that "an exceptionally low car mileage cost of operation has produced beneficial results," for he will find the operating expenses of the year ending June 30, 1894, to be 59 per cent of the gross receipts.

For the year, January 1, 1894, to December 31, 1894, the operating expenses amount to less than 53 per cent of the gross receipts.

During the greater part of the year ending June 30, 1893, the road was under other management than that of the writer, who took charge in January, 1893, and found plenty to occupy his time and ingenuity in putting mechanical and electrical appliances in proper condition for a low cost of operation per car mile in order that the "beneficial results" mentioned by "G. E. T." might follow.

Respectfully,

HARTFORD P. BROWN.

Edmund Saxton has the contract for constructing the Ninth street electric line of the Metropolitan Railway, Washington, D. C. One thousand men will work until August 2, when the job must be completed.

SUBURBAN RAILWAYS AND THEIR POSSIBILITIES.

BY CHAS. M. SWIFT, PRESIDENT WYANDOTTE & DETROIT
RIVER RAILWAY.

What I shall have to say on the possibilities of suburban street railways is mainly the result of experience with one road. This road has the advantage of being located near a large city and furnishes a connection between that city and a couple of small suburban towns. But it has so far suffered because the city line that gives its passengers access to the business portion of the municipality is equipped with a second class strap rail track, slow and dangerous; it is in competition with two railroads and a very fast and attractive river steamer; and nearly every manufactory furnishing employment to its patrons is shut down. With these discouragements, it nevertheless has succeeded in paying its expenses and the interest on its construction bonds (and I may say that the bond issue follows the usual course of slightly exceeding the cost) with something over for the stockholders. Its average passenger list is about 1,200 per day.

I am interested in another contemplated suburban railway which will start under much more favorable auspices. Its cars will run through without change; its terminal is a watering place overflowing for a large part of the year with pleasure and health seekers; the railroad competition is not so important and the highway which it will traverse is well built up with prosperous farms and truck gardens. While my connection with these roads has led me into no profound study of the subject, it has naturally induced me to give some thought to the possibilities of the suburban electric railway of the future; and the result, for what it is worth, and with all the diffidence for which street railway men are distinguished, is submitted.

A well equipped suburban street railway is a public boon. An idea of its benefit may be gained by a consideration of the status of any route before and after construction. As I prefer the concrete to the abstract, I will take for illustration the Gratiot Road over which route the Rapid Railway Company is about to construct its line between Detroit and Mt. Clemens. Along this road, beyond the city limits for fifteen miles, there is at present no railway connection. The residents are shut off from all communication with Detroit and Mt. Clemens, except with horse and wagon or on shanks mare. The electric railway will operate its cars to the Detroit city hall at an average rate of fifteen miles per hour. Its cars will start either way every thirty minutes, and the tariff per passenger will only slightly exceed the present rate of toll for a single horse. The Roseville farmer with business in Detroit now pays, going and coming, 28 cents toll, occupies an entire day, and spends whatever may be the value of a horse and wagon in a thirty-mile drive. On the electric railway he will make the round trip in two hours, save the wear and tear on his horse and

vehicle and several hours time, and all for an additional expenditure of two cents.

At Mt. Clemens the experience at Wyandotte and Trenton will undoubtedly be repeated. The Grand Trunk trains will be a trifle faster than the electric railway, but they are dusty and noisy. They start from an out of the way station at one terminal and deliver their human freight in the outskirts of the other, and their number is limited. The electric railway cars will start every half hour from the business center of Detroit, will be ready to receive passengers at every corner, will be dustless and comparatively noiseless, and will run to the very doors of the hotels and bath houses.

At present six times as many people go and come from Wyandotte by the electric cars as ever went over the lines of the Michigan Central and Lake Shore railroads. The fact is very significant, for the railroads still retain a large percentage of their former travel. It means that the suburban electric railways on country highways fill a long felt want, and it is as heartily appreciated as was the horse car when originally introduced in city streets. It makes business trips and visits and shopping tours and pleasure excursions the property of every one and at a nominal cost. It creates its own trade, and transportation that was once regarded as an extravagance or useless luxury becomes a daily necessity.

A railroad trip is a journey, an undertaking, a matter of care and consideration. A trip on the electric car is simply a street car ride—no going to a station, no purchase of a ticket in advance, no waiting for a long and expected signal. It simply means swinging aboard in front of your own door and getting off wherever you please.

If the first operation of a suburban street railway is thus beneficent neither is the development which it encourages to be lost sight of. The tendency of modern civilization is to crowd the population into cities. However much we may deplore it, this tendency is a growing one. Where men do most congregate money is to be made. The modern overpowering commercial instinct recognizes this fact, and acts upon it. Yet there is, even in city-bred men, a powerful instinct for the purer air of the country. The rich gratify this instinct with their seaside and mountain homes, but the less favored citizen is more restricted. He must be near his business, and he must be economical. The suburban electric railway, the poor man's chariot, gives him his opportunity. An hour from his business he can find cheap land and fresh air. The saving of rent and taxes will more than make up for transportation, and his children have a city education and country training. Without going into the domain of fanciful speculation I look to see the suburban railway of the future the greatest factor in the relief of congested cities.

What the electric railway can do for the carriage of passengers along country highways has been demonstrated. Its possibilities in the carrying of freight are yet to be developed. At present the principal use of highways is the transportation of farm and dairy produce.

The receipts of the toll road between Detroit and Mt. Clemens show that over one hundred thousand single loads of farm produce are carried and average the entire length of the road. I have not at hand the figures for the other roads leading into Detroit. Perhaps the Mt. Clemens road furnishes transportation for more than the average. A great agitation has lately sprung up in various parts of the country looking towards better country roads, the avowed purpose being to cheapen the cost of transportation by horse power for farmers. In 1893 an attempt was made to induce the Ohio legislature to authorize the various counties to appropriate large sums of money for the improvement of country roads. It was claimed, however, that the cost of transportation over the best country road that could be built would largely exceed the cost of transportation over steel rails, and there was opposition to the good-roads project on this account. The whole matter, by joint resolution, was referred to a commission whose duty it was to "thoroughly investigate the whole subject of road construction and the cost of transportation over the various kinds of roads, including those operated by steam power as well as those operated by horse power."

The report of that commission made to Gov. McKinley is before me, and furnishes much valuable information which makes very interesting reading for persons interested in the development of electric roads along country highways. The unanimous opinion of the commissioners was adverse to permitting the expenditure of any money for the building of good roads by macadam or paving, for the reason that the cost of transportation by electricity over steel rails was much cheaper than it could possibly be made to be over the best invented pavement with horse power. Tables and figures were submitted, showing that with electricity and steel rails, freight could be carried at the same cost, five times as far as with horses. The commissioners were of the opinion that electricity must soon supplant horse power for most purposes. They concluded that five miles would probably measure the distance that the horse could be used for either pleasure or profit, and they could see no reason why electric railways could not be carriers of freight as well as of passengers, adding that "it is not at all visionary to surmise that as steam railways superseded horse power for long hauls, so the electric railway may supplant it for short hauls."

I think that it would pay every street railway man who is interested in street suburban roads to send for a copy of this report, I believe that it may be obtained from Martin Dodge, who is president of the commission. The result of this report was the adoption of a law granting electric railways the right to carry freight.

In my opinion, as much business will be done by the future suburban railway in carrying freight, as passengers, and business will increase with the facilities. Progress is bound to be slow for a few years, however, until the status of the electric railway running along country highways, has been definitely fixed by the courts. Our supreme court has already decided clearly and

emphatically, that the building of an electric railway along a public street creates no additional servitude, and entitles the adjacent owner to no compensation. The decision does not yet include roads built avowedly to carry freight. As the building of such roads would meet bitter opposition from steam railways, the matter will have to be fought out; but the ultimate decision must be in favor of a rule equally applicable to the carrying of passengers and country freight. The question is not without difficulties, for it is not always easy to see the line of demarcation between what constitutes and what does not constitute a new servitude. A steam railway, carrying either passengers or freight, does create a new servitude; an electric railway carrying passengers does not. The reason for the distinction is that the electric railway, like a horse railway, is simply another method of carrying out the purpose for which the road was originally created. It does not impede or obstruct a highway, but makes it more effective. The sole purpose of highways is to afford facilities to the adjoining proprietors and others, for passage and transportation of persons who wish to go from one part of the highway to another, and for transportation of merchandise, packages, farm and dairy produce and manufactured goods, from one part of the highway to the other, or of either, through the highway to adjacent points; but no method of transportation adopted by one person can permissibly be of such exclusive character as to prevent other legitimate uses of the highway.

Steam railroads are thus exclusive because of their peculiar construction and operation; but, the courts have decided that electric cars carrying passengers on tracks practically flush with the grade, are not thus exclusive, but that such use is consistent with all other legitimate uses of the highway, it is difficult to conceive how the carriage in electric cars, on the same track, of farm and dairy produce, and farm utensils, and personal baggage, which would otherwise be hauled by horse power over the same highway, can be constructed to be illegitimate.

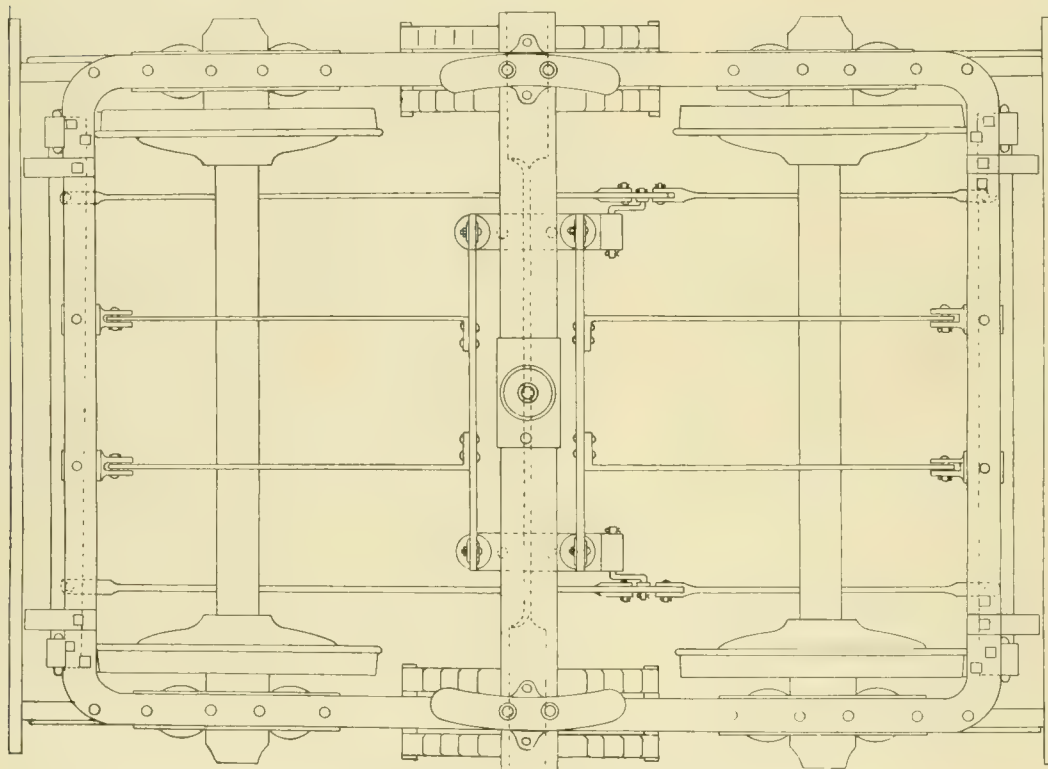
One feature of the suburban electric travel remains to be considered. A double tracked, well balanced road, with rapid and smooth running electric cars, furnishes not only quick transportation, but enjoyable recreation. Of a hot summer evening, nothing is more delightful or exhilarating, than a ride on an open trolley car, over a suburban route where a high speed is maintained with few stops. In the suburbs of Philadelphia, during the summer just passed, the passion for riding on suburban trolley cars was so universal and contagious that it assumed the character of a disease, which physicians named trolleyosis. A few years will see, I think, a great development in the pleasure features of country travel on trolley roads. Travelers who seek pleasure, must be accommodated with the best style of cars, and every possible comfort. If these are provided, no branch of the street car business will give such remunerative returns.

I conclude with the suggestion that the street railway act should be amended so as to permit the carriage of

country freight, farm and dairy produce, and, if legally possible, the right to grant franchise for a longer term than thirty years should be added. That term is entirely too short to secure the capital necessary for the proper development of such enterprises. With legislative encouragement I think capital can be interested in the building of electric railways along country highways on a scale far exceeding anything yet attempted. There is an enormous business which railroads are unable to do, or have refused to do, which can be profitably done by the suburban electric railway.

LACONIA SWIVEL TRUCK.

The accompanying drawings are of the Laconia Car Company's new swivel truck for double truck cars. The



PLAN OF LACONIA SWIVEL TRUCK.

strong point of the truck is its simplicity and consequent strength. This, of course, means economical maintenance. All parts are interchangeable, and hot Norway iron rivets are used throughout in its construction.

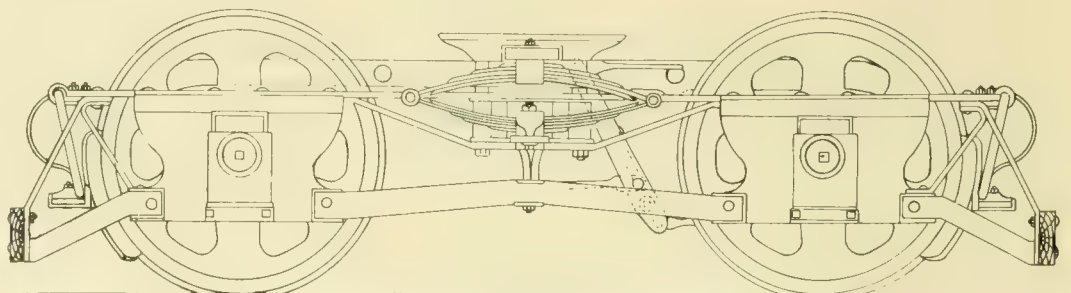
The facilities enjoyed by the company for the manufacture of iron trucks are excellent. The malleable iron mill is one of the most complete in New England, and makes castings for the West End Street Railway Company, the Gene-

ral Electric Company, and many others. The annual capacity of the electric department is 1,000 trucks. That of the car-wheel works is 15,000 wheels.

The Laconia Car Company was founded in 1850, and pursued the even tenor of its way until June, 1894, when the new street-car department was entirely destroyed by fire. The burnt shops were at once rebuilt on a larger scale, according to plans dictated by the experience of nearly fifty years. Besides being one of the busiest, Laconia is one of the most picturesque of the numerous manufacturing villages with which the state of New Hampshire is dotted. Its best known industry is without doubt the Laconia Car Company, whose works give employment to seven hundred men, all skilled in their trades.

Many acres of ground are covered by the shops, mills, lumber yards and dry kilns. These are all connected by railroad tracks, facilitating the movement of material to and from the various parts of the establishment. The areas of the department shops are as follows: Mill, 60 by 100 feet; paint shop, 50 by 270 feet; cabinet-makers' shop, 40 by 150 feet; blacksmith shop, 40 by 150 feet; gray iron and wheel shops, 40 by 200 feet; malleable iron mill, 150 by 200 feet. The yards and storage rooms for green and dry lumber are large in proportion to the rest of the plant.

The Laconia standard truck, made by the Laconia company, is one of its well-known specialties, several hundred having been sold during the past year. A great many of these trucks are in use on the West End road of Boston, by which they have been adopted as the standard.



SIDE ELEVATION—LACONIA SWIVEL TRUCK.

NEWS FROM THE CITIES

Alabama.

MONTGOMERY, ALA.—A bill is pending in the legislature for the incorporation of the Phoenix City Railway Company.

MOBILE, ALA.—It is reported that the bondholders will take control of the Mobile & Spring Hill Railway Company and change to electric equipment.

California.

SAN FRANCISCO, CAL.—It is reported that the Market-street Railroad Company will convert its steam road into electric.

LOS ANGELES, CAL.—The owners of the Los Angeles & Pasadena Electric Railway Company will, it is reported, build a line to Santa Monica.

Canada

LONDON, ONT.—The street railway company will extend its lines to London West.

OTTAWA, ONT.—The Kingston & Ottawa Railway Company may equip its line with electricity.

ST. JOHN, N. B.—E. F. Clements is forming a company to build an electric line to Yarmouth, N. S.

PORT COLBORNE, ONT.—The Point Albino Street Railway Company has been granted a franchise to Point Albino.

LONDON, ONT.—The London Street Railway Company has asked the council for permission to make extensions.

OTTAWA, CAN.—John Bryson, M. P., is interested in the Quinze Railroad Company, which will build fifteen miles of electric line from Temiscamingue to Quinze lake.

OSHAWA, ONT.—The town council has contracted with E. W. Rathbun, Deseronto, for the construction of an electric road between town and harbor. The road is to cost \$100,000, and be completed September, 1895.

NIAGARA FALLS, ONT.—The Niagara River Tramway Company will incorporate, with \$40,000 capital, to build a cable tramway over Niagara river. Joseph Tait, John Flett, Toronto, and L. C. Raymond, Welland, are interested.

PORT COLBORNE, ONT.—The Point Albino Street Railway Company is seeking incorporation, with \$100,000 capital, to build an electric line to Fort Erie. F. F. White, Donald McGillivray, Port Colborne, and Leonard McGlashan, Humberstone, are interested.

Chicago.

CHICAGO.—The city will build a bridge to cost \$21,500 with a viaduct approach to cost \$426,000.

CHICAGO.—The Ogden Street Railroad Company has been given a franchise in Cicero by paying within thirty days \$25,000 cash into the town treasury and giving bond in like sum.

CHICAGO.—The Loop Construction Company has been incorporated with \$1,000,000 capital by C. Douglas Hotchkiss, George E. Newlin, William M. Johnson, to build the union elevated loop.

CHICAGO.—The Chicago & North Street Railway Company has been incorporated with \$2,000,000 capital by W. W. Beatty, J. H. Smith and M. Skinner. The names of none of the incorporators are in the City Directory.

CHICAGO.—Azel F. Hatch, one of the proprietors of the Herald and Post, is interested in organizing a company with \$2,500,000 capital, to build 100 miles electric road from Merced in the San Joaquin Valley to the Yosemite Valley. William H. Mills, land agent of the Southern Pacific, says right of way has been secured.

Colorado.

MANITOU, COL.—Senator M. A. Leddy reports arrangements made for the electric line from the Colorado Springs to Iron spring.

DENVER, COL.—The Griffin Wheel & Foundry Company will establish a branch plant here after the first of the year to supply western trade.

DENVER, COL.—The Clear Creek Gold Mining & Water Power Company has been organized by New York, Philadelphia and Denver parties to operate a "harnessing Niagara" plan and furnish electric power. Henry Levis, Philadelphia, president; Scott J. Anthony, Denver, vice-president; E. W. Rollins, Denver, treasurer; Dr. W. G. Smith, Denver, secretary.

Connecticut.

WAREHOUSE POINT, CONN.—The Enfield Longmeadow Electric Railway Company will extend its line.

HARTFORD, CONN.—The Central Railway & Electric Company has been granted right of way through Newington.

BRISTOL, CONN.—The selectmen have refused to grant a franchise for extensions to the Bristol & Plainville Tramway Company.

NEW HAVEN, CONN.—The New Haven Street Railway Company and the Fairhaven & Westville Railway have applied for franchises for extensions.

NEW HAVEN, CONN.—It is reported that the New Haven Street Railway Company is negotiating the purchase of the Edgewood Avenue Electric Road for \$125,000.

WESTPORT, CONN.—President A. S. Hurlburt, of the Westport & Saugatuck Horse Railroad, has petitioned the legislature to change the charter of his road so as to permit the use of electric power.

District of Columbia.

WASHINGTON, D. C.—The Metropolitan Railway Company has been mortgaged for \$1,850,000 to provide improvements.

WASHINGTON, D. C.—The commissioners have approved the amendment of the charter of the Washington & Georgetown Railroad Company, permitting it to make extensions.

WASHINGTON, D. C.—The East Washington Belt Line Railway Company is being organized with \$50,000 capital by Calderon Carlisle, H. L. West, W. P. C. Hazen and others.

WASHINGTON, D. C.—Senator Teller has introduced a bill for the incorporation of the National Rapid Transit Railroad Co., to build an elevated road to New York to be operated by electricity. The incorporators are: Noah L. Jeffries, Joseph J. Reynolds, John F. Hemphill, Charles M. Shelley, Samuel M. Bryan, A. M. Bliss, Howard S. Reeside, Lewis A. Grant, Benjamin Butterworth, John F. Ginal, George F. Brott, Hamilton Disston, C. F. Kindred, Isaac D. Hetzel, Virgil D. Stockbridge, Hiram Woods, H. C. Turnbull, William L. Brown, Thomas Ewing, John C. Calhoun, Henry Cummings, Moses Sweetzer and Henry T. Welles. The capital is to be \$15,000,000 with privilege of increasing.

Florida.

CRESCENT CITY, FLA.—The Crescent City Traction Company has been granted a franchise.

Georgia.

VALDOSTA, GA.—A company is being organized to build an electric line.

ATLANTA, GA.—W. A. Hemphill and others are interested in a proposed suburban electric line.

ATLANTA, GA.—Dayton Hale is in charge of a project known as the Atlanta Electric Railway, which will build to a new resort.

ATLANTA, GA.—The Atlanta Consolidated Street Railway Company will spend \$100,000 for improvements during the year, and will be in the market for fifty or sixty cars. A new company is being organized to build a line to the Exposition grounds.

Illinois.

PEORIA, ILL.—The Central Street Railway Company will extend its line.

ROCKFORD, ILL.—The Rock River Electric Road will begin work on its line to Dixon in the spring.

OREGON, ILL.—The Rock River Electric Railway Company has been granted a franchise in Ogle county.

WATSEKA, ILL.—Arthur A. Spitzer, of Richmond, Va., is interested in the proposed electric road from Onargo to Watseka, via Gilman and Crescent City.

WAUKEGAN, ILL.—Homer Cooke, president of the Bluff City Electric Street Railway Company, has an office at Room 50, Borden block, northwest corner of Randolph and Dearborn streets, Chicago.

ELGIN, ILL.—The Dundee Rapid Transit Company assigned to M. H. Thompson, president of the Elgin National Bank. The company had just built a power house and established an electric lighting system. The stock of \$50,000 was held by E. C. Hawley, G. F. Oatman, and William Fay, manager.

Indiana.

CRAWFORDSVILLE, IND.—N. J. Clodfelter will build an electric road within eighteen months.

TERRE HAUTE, IND.—The People's Electric Railway Company has been granted a franchise.

ALEXANDRIA, IND.—Joseph E. Jeffries has been granted a franchise to build six miles of electric road.

ELKHART, IND.—The Indiana Electric Railway Company is in the market for four 125-horse-power engines. Power is now rented from the Home Electric Company.

COLUMBUS, IND.—John S. Crump has bought the Seymour street railway and dummy line. He will tear up the tracks and use the material to extend his local line.

INDIANAPOLIS, IND.—The county commissioners have granted a franchise to the Indianapolis, Greenwood & Franklin Electric Railway Company. Work will probably begin in the spring.

FRANKLIN, IND.—The Indianapolis, Greenwood & Franklin Railway Company has been voted \$34,000 by Pleasant township. The road will be completed by June. Grafton Johnson and J. T. Polk, Greenwood, are interested.

ANDERSON, IND.—C. L. Henry has been granted a franchise for his line through Pendleton. Work will begin at Alexandria, Anderson, Marion and on a spur to Elwood, and by August, seventy-five miles are expected to be completed.

Iowa.

IOWA CITY, IA.—The city will give \$5,000 cash to any one who will build an electric railway.

DUBUQUE, IA.—The Dubuque Light & Traction Company, John Balch, receiver, will replace its overhead work.

SIoux CITY, IA.—The Sioux City Traction Company, J. B. Walker, superintendent, is in the market for smoke stacks.

SIoux CITY, IA.—The Morning Side Railway Company, J. A. Jackson, president, contemplates changing from steam to electric power.

Kansas.

ATCHISON, KAN.—The Atchison Electric Street Railway opening was celebrated with enthusiastic public exercises.

Kentucky.

PADUCAH, KY.—The Paducah Electric Company has purchased the Citizens' Railway Company and will change it to electric power. Elbridge Palmer is interested.

Louisiana.

NEW ORLEANS, LA.—The St. Charles Street Railway Company has issued \$400,000 stock and will change its lines to electric.

BATON ROUGE, LA.—All the property of the Capital Railway & Lighting Company has been seized by the Bank of Baton Rouge.

NEW ORLEANS, LA.—Henry T. Beauregard, J. D. St. Alexander, and R. V. Ducross are interested in a proposed street railway to Chalmette cemetery, St. Bernard parish.

Maine.

LEWISTON, ME.—The Lewiston Bleachery & Dye Works will build a mile of electric line from the Maine Central Railroad to its plant.

WATERVILLE, ME.—S. C. Libby can give information concerning a proposed electric line twenty miles long to Augusta with various branches.

PORTLAND, ME.—F. Coleman Boyd, of the New Haven Car Register Company, New Haven, Conn., is interested in the proposed electric road to Kennebunkport, which is intended to be completed next summer.

SKOWHEGAN, ME.—The Skowhegan, Madison & Athens Street Railway & Power Company, J. P. Oak, T. H. Anderson and J. W. Gould will build nineteen miles of electric road to Hayden Lake, with branches to Madison, East Madison and Athens.

Maryland.

BALTIMORE, MD.—The Baltimore Traction Company will extend its lines.

DENTON, MD.—W. H. Bosley, Baltimore, is interested in a proposed electric line to Rehoboth Beach, Del.

BALTIMORE, MD.—The Baltimore & Catonsville Railway Company, will extend its line four miles to Ellicott City, and equip with electricity.

BALTIMORE, MD.—The City & Suburban Railway Company will build a bridge 1,600 feet long, being of pile construction, with a steel draw.

BALTIMORE, MD.—The Mount Washington Electric Railway Company has been granted a franchise to lay flat grooved rails on country roads.

BALTIMORE, MD.—The Baltimore City Passenger Railway Company will equip its Eutaw street line with electricity. It is in the market for open cars.

BALTIMORE, MD.—The Baltimore, Middle River & Sparrows Point Electric Railway Company, James Young, president, wants two or more 25-horse-power motors.

BALTIMORE, MD.—Reports are current that the Pennsylvania Railroad and the Baltimore & Lehigh Railroad Companies will convert certain divisions into trolley lines.

BALTIMORE, MD.—The Baltimore Traction Company has bought the Walbrook, Gwynn Oak & Powhatan Electric Railway. The Traction Company will convert its Waverly horse line to electric.

BALTIMORE, MD.—Henry Yewell Bready, Chesapeake bank building, North and Fayette streets, will construct the Baltimore, Severn Park & Annapolis Electric Railway Company, a single track road, 25 miles long. Six 500-horse-power generators and 1,250 octagonal poles are wanted.

BALTIMORE, MD.—The contract for constructing the Annapolis, Bay Ridge & Brighton Beach Electric Road, has been awarded to Henry Yewell Bready, successor to Smith & Bready. All communications relating to electrical equipment, track materials, power house, etc., should be addressed to his office, Chesapeake Bank building, North and Fayette streets. January 1, construction began.

BALTIMORE, MD.—The Susquehanna River Electric Company has been incorporated with \$100,000 capital by Moses H. Houseman, George K. McGaw, John S. Bull, W. J. Taylor, Baltimore, and Charles R. McConkey, Peach Bottom, Pa. It is reported that the Westinghouse people are behind the company which expects to furnish power to the street railways of Baltimore, Wilmington, Philadelphia and intermediate towns.

Massachusetts.

HUDSON, MASS.—The electric railway is to be extended.

WALTHAM, MASS.—The Newton Street Railway Company has been given a franchise to extend to Forest Grove.

TAUNTON, MASS.—The Taunton Electric Railway Company has secured an extension until May 1st, of its franchise.

CONWAY, MASS.—The Conway Electric Railroad Company will issue \$25,000 of 6 per cent bonds to pay for improvements.

ATTLEBORO, MASS.—J. T. Sweet, M. B. Short and Peter Merry are interested in a street railway project and will soon build a power house.

SOUTH MIDDLESEX, MASS.—The South Middlesex Street Railway Company has opened its electric line from South Framingham to Ashland.

LOWELL, MASS.—The Suburban Railway Company has taken all the stock of the Nashua Company and will operate an electric line from Nashua to Newburyport.

LEOMINSTER, MASS.—The franchise granted the Worcester North Street Railway Company has expired, by neglect to have line to Fitchburg and Lunenburg built by Dec. 1.

LOWELL, MASS.—President G. H. Campbell, General Superintendent Morton and Superintendent of Overhead Construction Hoyt successfully opened the new electric line to Lawrence.

ATTLEBORO, MASS.—The Attleboro, North Attleboro & Wrentham Railway Company was sold to Edward R. Price, North Attleboro, representing a syndicate. New cars and a new power house are among the contemplated improvements.

REVERE, MASS.—O. E. Lewis, Frank E. Peaslee, Willard M. Bacon, James R. O'Hara, Lawrence Neeb, Winthrop; George E. Leighton, Boston; E. P. Shaw, Newburyport, have organized, with \$20,000 capital, to build and electric line to Winthrop.

Mexico.

MEXICO CITY, MEX.—By purchasing the Valley Railroad for \$700,000, the District Railway Company has obtained complete control of the entire street and suburban railway system of several hundred miles, in this city and vicinity.

Michigan.

DETROIT, MICH.—Samuel Harris is estimating the cost of changing various lines of the Citizens' Street Railway Company to electric.

SAGINAW, MICH.—The Consolidated Street Railway Company has accepted its ordinance, and will expend \$200,000 on improvements, work beginning at once.

MUSKEGON, MICH.—Fred A. Nims is receiver of the Muskegon Electric Railway Company, at the instance of the Northwestern National Bank, Chicago, mortgagee.

DETROIT, MICH.—The Detroit Metropolitan Street Railway Company, Fred H. Cozzens, A. E. Riopelle and C. W. Walton, will soon construct a horse line on Twelfth street.

ADRIAN, MICH.—Frank E. Snow, of Detroit, has been appointed receiver of the Adrian Electric Street Railway Company. The road was bonded for \$50,000 and defaulted on the interest.

MT. CLEMENS, MICH.—The Mt. Clemens Street Railway Company, Matthew Slush, manager, is in the market for good second hand open cars, also good relaying T rails 50 to 60 pounds to the yard.

BIRMINGHAM, MICH.—A Detroit syndicate, headed by E. W. Voigt and James A. Randall, has been granted a franchise to run electric cars from Detroit through Birmingham to Pontiac and Orchard Lake.

Mississippi.

NATCHEZ, MISS.—The Natchez Street Railway Company will change its equipment to electric.

Missouri.

ST. LOUIS.—The Lindell Railway Company will build a double track extension two miles long.

KANSAS CITY, MO.—The Northeast Electric Road is reported to be controlled by the Metropolitan.

KANSAS, CITY, MO.—The Rapid Transit Railway Company is making improvements and will change motive power.

KANSAS CITY, MO.—The Grand Avenue Cable Railway Company has been given a franchise for an electric line in Westport.

ST. LOUIS, MO.—Frank M. Jencks, Ferdinand Meyer and Henry Schroeder have been granted an electric road franchise in the village of Brooklyn.

KANSAS CITY, MO.—General Manager F. M. Bernardin, of the Metropolitan Street Railway Company, says the Vine street line will be relaid with 100-pound rails.

OREGON, MO.—N. F. Murray presided at a meeting to consider a proposition for the town to vote \$10,000 for an electric railway to Forest City. Sentiment seems to favor the idea.

ST. LOUIS, MO.—The Forest Park Service Road Company has applied for an electric franchise in Forest Park. W. T. Moore, E. G. Savage and George Morgan are interested.

CARTHAGE, MO.—The Joplin Electric Railway Company has been sold for \$35,000 to the Carthage, Webb City, Joplin & Galena Railway Company. It is the intention to extend it to Galena.

ST. LOUIS, MO.—The Florissant Avenue Electric Railway Company has applied for a fifty-year franchise, and guarantees the operation of the road within ninety days after franchise is granted.

ST. LOUIS, Mo.—The Southern Electric Railway Company will build a single track road from Carondelet to Jefferson Barracks. The Union Depot Company may also extend to Jefferson Barracks.

SPRINGFIELD, Mo.—The Metropolitan Street Railway will be sold by the special master, January 26, if the council gives its consent. A syndicate has been formed which will bid \$200,000 for the road.

KANSAS CITY, Mo.—A 42-foot bridge is proposed across the Kaw river, half for the use of the Traction Company, half as a public roadway, and the upper deck to be controlled by the Kansas City Elevated Company.

ST. LOUIS, Mo.—The Florissant Avenue Electric Railway Company has been incorporated with \$2,000 capital by Edward R. Feurburn, 315 N. Seventh street, Joseph H. Schroeder, 808 N. Fourteenth street, and Theodore P. Bell, 925 Chestnut street.

New Jersey.

ATLANTIC CITY, N. J.—The Camden & Atlantic Railroad will be changed from steam to electric equipment.

MORRISTOWN, N. J.—J. E. Melick, engineer, will build street railways to Mendham, Morris Plains, Whippany, etc.

NEWARK, N. J.—The Passaic & Newark Electric Railway Company has petitioned for a franchise through Franklin township.

WOODBURY, N. J.—The Camden, Gloucester & Woodbury Company ordinance for an electric line was passed over the mayor's veto.

HACKENSACK, N. J.—The Bergen County Traction Company has been incorporated with \$500,000 capital by Philadelphia parties. John Aird Dempsey is the local stockholder.

CAMDEN, N. J.—It is reported that the Pennsylvania Railway Company has leased the Vincentown, and Mount Holly, Lumbertown and Medford branch roads to a company which will convert them into electric lines.

TRENTON, N. J.—The Fairmount Park Transportation Company has been incorporated with \$2,000,000 capital by John B. Peddle, Woodbury; Alexander Renwick, Philadelphia; John D. Yarrow and Richard F. Bower, to build an electric road in Fairmount Park, Philadelphia.

WOODSTOWN, N. J.—A trolley line connecting Woodbury, Woodstown, Pennsgrove, Pennsville and Salem is projected by John S. Somers, Dr. George Reading, Thomas J. Stratton and Joseph Sickler, of Gloucester county, Judge Murphy, of Chicago, and J. S. Connelly, of Trenton.

ASBURY PARK, N. J.—The Deal Lake, Asbury Park & Ocean Grove Transit Company has been incorporated, with \$150,000 capital, by Halsey M. Bennett, Bloomfield, N. J.; Wm. E. Cottrell, Newport News, Va.; R. Ten Broeck Stout, Joseph C. W. Stout and Wesley B. Stout, Asbury Park, N. J. It is proposed to build an electric line connecting the summer resorts on the New Jersey coast.

TRENTON, N. J.—The Trenton Traction Company has been incorporated to control the Trenton electric lines and operate in connection with the New York & Philadelphia road. Capital, \$500,000, divided into 10,000 shares, of which Thomas C. Barr, of East Orange, N. J., holds 4,000; Edward J. Moore, Philadelphia, 4,000; John L. Kuser, Trenton, 800; F. W. Roebing, Trenton, 400; and G. B. Jenkinson, Newark; W. S. Stryker, Trenton; H. H. Hamill, Trenton; and F. M. Eppley, West Orange, each 200 shares. Thomas C. Barr, Newark, is president; directors E. J. Moore, Philadelphia, A. R. Huser, F. W. Roebing, John L. Kuser, S. K. Wilson, Barclay L. Stokes; Henry Moore, general manager.

North Carolina.

ASHEVILLE, N. C.—The Asheville & Biltmore Street Railway Company will build a street railway to the Vanderbilt estate, Biltmore.

New York.

HUDSON, N. Y.—The Hudson Electric Railway Company has applied for a franchise.

BATAVIA, N. Y.—The Batavia Street Railway Company's franchise has been granted.

JAMAICA, L. I.—The Long Island Electric Railway Company has secured its franchise.

TROY, N. Y.—The Troy City Railway Company will equip its Green Island division with electricity.

BINGHAMTON, N. Y.—The Binghamton & State Line Railroad will probably be operated by electricity.

NEWBURG, N. Y.—The Newburg Electric Railway Company will be extended from Orange Lake to Walden.

WHITE PLAINS, N. Y.—The New York & Elmsford Railroad Company has applied for an electric road franchise.

SAYVILLE, L. I.—A trolley line is projected to Bohemia, Ronkonkoma, New Village, St. James and Port Jefferson.

SENECA FALLS, N. Y.—The Seneca Falls & Orchard Beach Railway Company is being organized with \$25,000 capital.

RAVENA, N. Y.—An electric line is to be built to Rensselaerville, via Coeymans and Westerlo, a distance of twenty miles.

ISLIP, N. Y.—The Electric Construction Company, New York, has been granted its franchise from Brentwood to Babylon.

GARDENVILLE, N. Y.—Messrs Ferrand, Doltsch, Grier, Wagner and Lein are a committee to solicit subscriptions for an electric line.

MOUNT VERNON, N. Y.—Horace Loomis and others have bought the plant and franchise of the North Mount Vernon and Chester Hill Horse Railway.

NYACK, N. Y.—J. H. Browning, president of the Northern New Jersey Railroad Company, is interested in a project to build an electric line to Hook mountain.

CORNING, N. Y.—The Corning & Painted Post Railroad Company has been granted a franchise, work to begin by the 1st of March and completed during the year.

LONG ISLAND CITY, N. Y.—Patrick J. Gleason has, it is said, sold his controlling interest in the Long Island & Newtown Creek Railroad to the Steinway syndicate for \$275,000.

NEW BRIGHTON, N. Y.—The Midland Railway Company has been granted a franchise to equip its line with electricity. July 1, 1895, is the time the work must be done, and the road in operation.

NEW YORK, N. Y.—The Metropolitan Street Railway Company has completed its cable line on Columbus avenue from Ninety-eighth street to Fifty-third street, connecting with the Broadway cable.

HERKIMER, N. Y.—President Clinton Beckwith of the Herkimer and Mohawk road is said to be interested in a plan to consolidate the street railways of Herkimer and Frankfort and equip with electricity.

FLUSHING, N. Y.—The Flushing & College Point Electric Railway Company has been incorporated with \$125,000 capital by Daniel Odell, E. Bayard Halstead, Paul D. Cravath and others, of New York City.

CORNING, N. Y.—The officers of the Corning & Painted Post Electric Street Railway Company, recently incorporated, are Edward W. Shedd, Worcester, Mass., president; Hosea A. Clark, Corning, secretary.

NYACK, N. Y.—The River & Valley Traction Company has been incorporated by Harrison & Dalley, Lydecker Bros., H. Kessler, C. Quidor, Ernst Bros., W. R. Thompson, John Magee and John D. Blauvelt.

NYACK, N. Y.—The Nyack Traction Company has been incorporated with \$50,000 capital, by B. B. Odell, Jr., of Newburgh; Ferdinand B. Bain, builder of the Poughkeepsie lines, and A. S. Tompkins, judge of Rockland county.

BROOKLYN, N. Y.—The board of highway commissioners has granted the Brooklyn, Newtown & Bowery Bay Railway a franchise from Green Point to Bowery Bay. E. B. Gallaher, M. E., 253 Broadway, New York, will have full charge of the engineering and construction of the road.

BATAVIA, N. Y.—The Batavia and Northern Railroad Company has been incorporated with \$325,000 capital to build to Albion, by George A. Wingate, Jacob Cole, William Hazzard, Robert Avery, James Cox, New York and Brooklyn; Oren Steele, David Lent, Batavia, and D. S. Beckwith, Albion.

WAVERLY, N. Y.—The Waverly, Sayre & Athens Electric Traction Company and the Susquehanna Electric Traction Company have been consolidated with \$200,000 capital by S. B. Broadhead, Jamestown; F. K. Harris and A. C. Robertson, Athens, Pa.; W. L. Watrous and Michael Quigley, Waverly.

CORNING, N. Y.—The Corning Traction Company has been incorporated with \$40,000 capital to build an electric line to Painted Post, by Fred E. Lyford, Percy L. Langf, Clay Clapp, F. E. Hawkes, Waverly, Tioga county; D. N. Johnson, Ithaca; N. C. Harris, F. K. Harris, Charles Kellogg, A. C. Robertson, Athens.

STATEN ISLAND, N. Y.—The Staten Island Interior Railroad Company has been incorporated to build a 15-mile electric belt road from St. George through Tompkinsville, Stapleton and West Brighton. Capital, \$300,000; Herman Bergholtz, Ithaca, N. Y., president; vice-president, Cornelius Tompson, New Brighton; treasurer, Daniel Thompson Ithaca; secretary, Grant Crabtree, New York.

NEW YORK.—The Staten Island Electric Railroad Company has been incorporated, with \$1,250,000 capital, by George B. H. Harvey, Milton I. Bouden, John A. Hilton, John J. Walsh, William H. Hurst, John T. Mills, Eugene R. Leland, A. J. Hummell, and Henry Haggerty, of New York. A road twenty-two miles long is to be built between New Brighton and Edgewater and Northfield and Southfield.

Ohio.

SIDNEY, O.—The Sidney Electric Railway Company has been incorporated with \$100,000 capital.

TOLEDO, O.—The Toledo Consolidated Street Railway Company will build a double track belt line to cost \$16,000.

HARTWELL, O.—The New York Standard Construction Company has been granted a franchise for an electric road.

CARROLLTON, O.—Citizens will give McKeesport capitalists a bonus for an electric line to Steubenville and New Philadelphia.

DAYTON, O.—A new road is being staked out by the Dayton Traction Company. W. P. Noble is superintendent of construction.

KENTON, O.—The faculty of Ada Normal college are endeavoring to organize a company to build sixteen miles of electric road from Ada to Kenton.

AKRON, O.—The Akron Street Railway Company will extend its line to Turkey-foot lake and the West Reservoir, where a large summer resort is being developed.

CLEVELAND, O.—Martin Dodge, a member of the legislature, has a plan to connect all the county seats with electric lines to be built by the state and the several counties.

CLEVELAND, O.—The Cleveland Electric Railway Company will buy forty motor cars, thirty combination cars, seventy trucks, two miles of rails, five miles of trolley wire.

SPRINGFIELD, O.—Frank Whitely has bought the street railway at Arka, Ark., which will be equipped with electricity. W. H. Hanford has been put in charge as superintendent.

RAVENNA, O.—The Portage county commissioners have granted franchises to the Walsh-Babcock Street Railway Company and the Ravenna Electric Railway & Power Company.

MT. GILEAD, O.—Mr. Caldwell, of Mt. Vernon, representing the Central Ohio Electric Railway Company, has secured a franchise for his company from Mt. Gilead to the county line.

YOUNGSTOWN, O.—The Poland Railroad Company, incorporated with \$25,000 capital, G. M. Dill, president, A. O. Fording, secretary, has been granted a franchise for an electric line to Poland.

WARREN, O.—Franchise for an electric line connecting Niles and Girard has been asked for by E. A. Hartzell. D. J. Evans, C. R. Holenton, E. H. Bowen, W. J. Williams, W. C. Allison and J. F. Wilson.

YOUNGSTOWN, O.—A. A. Anderson, purchasing agent of the Mahoning Valley Electric Railway Company, writes that his company will build eight miles of road connecting Niles, Girard and Youngstown, in the spring of 1895.

CINCINNATI, O.—The C. H. & D. R. R. Company writes the question of erecting trolleys over the steam roadbed and operating electric cars between regular passenger trains for suburban service has never been seriously considered, and is not practicable on account of the number of regular trains.

COLUMBUS, O.—The Worthington Electric Street Railroad Company on December 7 elected the following officers: President, O. W. Aldrich; vice-president, George Van Loon; secretary and superintendent, R. M. Weaver; treasurer, H. C. Cook; executive committee, O. W. Aldrich, John J. Stoddart, W. Tuller, J. F. Wright and H. C. Cook.

Oregon.

PORTLAND, ORE.—The Barnes Heights & Cornell Mountain Road will be extended to Beaverton.

PORTLAND, ORE.—O. F. Paxton is receiver of the Portland Consolidated Street Railway Company.

SALEM, ORE.—The Salem Motor Company has secured subscriptions from property owners for the extension of its line.

Pennsylvania.

ERIE, PA.—The Erie Electric Motor Company will extend its lines.

LEBANON, PA.—The Reading Traction Company is securing right of way for extensions.

PHILADELPHIA, PA.—The commissioners of Fairmount Park, have established a route for the gravity trolley road.

LANCASTER, PA.—The Lancaster Traction Company has leased the Lancaster and Susquehanna turnpike to Columbia.

PITTSBURG, PA.—The Homestead & Highlands Street Railway Company has asked the Pittsburgh council for extensions.

EAST STROUDSBURG, PA.—The Delaware Valley Electric Railway has been shut out of the town by the veto of its ordinance.

WILKESBARRE, PA.—The Wilkesbarre & Wyoming Traction Company will build a car house with capacity for fifty cars.

MEDIA, PA.—The Delaware County and Philadelphia Electric Railway Company has completed its line from Philadelphia.

PHILADELPHIA, PA.—The Philadelphia, Bala & Narberth Railway Company has been granted an ordinance for an electric line.

GREENBURG, PA.—Franchise has been granted the Greensburg, Jeannette, Turtle Creek & Pittsburg Electric Street Railway Company.

PHILADELPHIA, PA.—The Philadelphia Traction Company has prepared plans for changing the Market street line from cable to electric.

PARKESBURG, PA.—The Parkesburg Electric Light, Heat & Power Company has been incorporated by Horace A. Beale, J. W. Wright and others.

POTTSTOWN, PA.—The Ringing Rocks Electric Railway Company will extend its line from Ringing Rocks to Boyertown, by way of Limerick and Colebrookdale.

PITTSBURG, PA.—The directors of the Castle Shannon Railroad Company have decided to change its six and a half miles from steam to electric and may make extensions.

OXFORD, PA.—Two electric roads are to be built, one to Parkesburg and the other to West Chester via Avondale, Toughkenamon, Kennett Square, Unionville and Marshalton.

CARLISLE, PA.—Contracts will be let about February 15 by W. F. Sadler for the building and equipment of the Greensburg, Jeannette & Pittsburg Street Railway, twelve miles long.

MAUCH CHUNK, PA.—The Inter-County Electric Railway Company has surveyed a line to Summit Hill, via Nesquehoning. The road will connect with the Carbon County Electric Railway.

COLUMBIA, PA.—Franchises have been granted the Columbia, Ironville & Mt. Joy Electric Railway Company, Conewago Water & Water Power Company and Pennsylvania Electric Light & Power Company.

HARRISBURG, PA.—Charters have been granted the Ohio Valley Electric Company, Benavon, Allegheny county, capital \$10,000, and the Ohio Valley Electric Company, Avalon, Allegheny county, \$5,000 capital.

PITTSBURG, PA.—The Washington Incline Plane Company has been incorporated with \$1,000 capital. Directors: C. Cramer, L. E. Burton, Harry Bohm, John Naegley, Pittsburg; and J. S. Chambers, Jr., Allegheny City.

OVAL, PA.—The company which is to build a trolley line in Nippenose Valley has elected the following officers: James B. Denworth, president; Jonas Moore, secretary, and John Engler, treasurer. Directors are the foregoing and G. W. Clark, Sr., Levi Gann, H. C. Eck, and Jacob Clark.

PHILADELPHIA, PA.—W. W. Gibbs, president of the Electric Storage Battery Company, says his company has bought the storage battery patents of the General Electric Company, Edison Company, Thompson-Houston, Brush, Accumulator, Consolidated Electric Storage Company and General Electric Launch Company.

South Carolina.

CHARLESTON, S. C.—Julius Fishburne is interested in a proposed electric line.

COLUMBIA, S. C.—The Metropolitan Street Railway Company has a bill in the legislature authorizing its incorporation.

Tennessee.

MEMPHIS, TENN.—The Citizens' Street Railway Company will extend its Raleigh division.

NASHVILLE, TENN.—The Nashville Street Railway Company will issue \$2,000,000 bonds to take up other bonds and make improvements.

KNOXVILLE, TENN.—It is reported that the directors of the Knoxville & Fountain Head suburban road will equip with electricity.

JACKSON, TENN.—The Jackson & Suburban Street Railroad will do its own reconstruction, but has not decided what electric system it will use. The company will be in the market for rolling stock in six weeks.

Texas.

SAN ANTONIO, TEX.—The San Antonio Rapid Transit Company will make extensions.

DALLAS, TEX.—The Dallas Rapid Transit Railroad was sold December 4th, by receiver C. F. Freeman, for \$35,000, to W. F. Thayer, E. A. Studley and B. L. Wathen, representing bondholders.

Vermont.

SPRINGFIELD, VT.—H. B. Holmes has a charter for a street railroad. No organization has been effected.

STOWE, VT.—C. L. McMahon has information of contracts which will soon be let for a road ten miles long to Waterbury.

Virginia.

CENTRAL CITY, VA.—It is reported that an electric line will be built to Catlettsburg, Ky.

ALEXANDRIA, VA.—The president has approved the bill granting right of way through the lower and eastern portion of the Arlington reservation to the Washington, Alexandria & Mount Vernon Electric Railway Company.

Washington.

TACOMA, WASH.—George Bird is receiver of the Tacoma Railway & Motor Company.

SEATTLE, WASH.—O. D. Colvin is receiver of the Front Street Cable Railway Company.

West Virginia.

GRAFTON, W. VA.—Business men are endeavoring to organize a company to build a line to Pruntytown.

Wisconsin.

GREEN BAY, WIS.—The Fox River Electric Railway Company will extend its line.

FOND DU LAC, WIS.—Elihu Colman secured the Fond du Lac Light, Power & Railway Company, at sheriff's sale for \$4,690.82.

APPLETON, WIS.—The Wisconsin Interurban Railroad Company has been incorporated, with \$1,000,000 capital, by A. L. Smith, H. D. Smith and T. B. Reid.

Contract for building the Edmondson Avenue, Catonsville & Ellicott City Electric Railway, from Baltimore to a point beyond Catonsville, has been awarded to Evans & Co., of Baltimore. The road must be built in ninety days. Evans & Co.'s contract covers track construction, overhead work, power house, car barn and rolling stock.

The Lancaster Railway Construction Company has the contract for building the extensions of the Reading Traction Company's system, at Reading, Pa. Work is progressing on the first section, fifteen miles long, the Medbery line material being used on all the overhead line work. The Hubley Manufacturing Company, Lancaster, Pa., will furnish all the material.

CAHALL VERTICAL WATER TUBE BOILER.

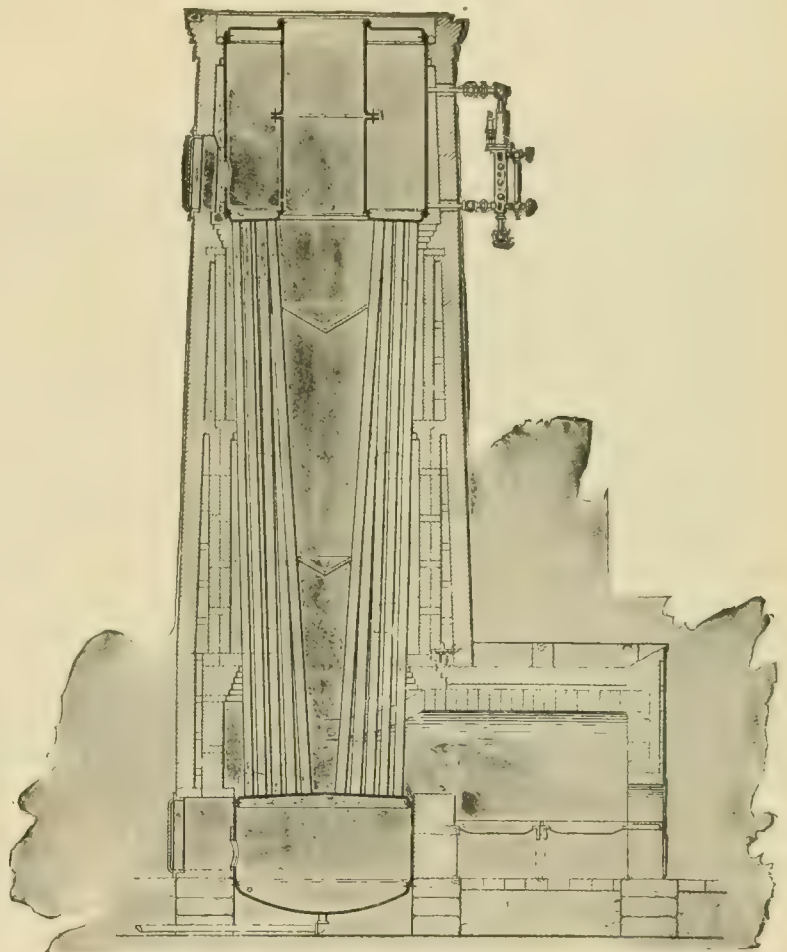
Manufacturers of water tube boilers say tubes in that class of boiler are seldom burned out on account of a general or uniform deposit of scale on their surfaces. Most tubes failing, are burned, they say, because of patches of light scale accumulating in the tubes, falling to the bottom, remaining there when the tube lies in a horizontal position. Many instances are reported, where tubes have scaled uniformly, an inch thick, without any loss from burning, while a single patch of scale, less than an inch in diameter, and $\frac{1}{8}$ -inch thick, on an otherwise clean tube, has caused tubes to burn out completely, at the point where scale is deposited. This defect has been overcome in the Cahall vertical tube boiler, according to the manufacturers, the Aultman & Taylor Machinery Company, Mansfield, O., and H. E. Collins & Co., Bank of Commerce Building, Pittsburg, Pa., sole agents for the United States, for the tubes are so arranged that any scale that might loosen, will fall to the mud drum at the bottom, whence, if small enough, it can be blown off through the blow-off pipe, or, if too large, can be removed through the manhole, on the regular cleaning day.

This boiler is described by the manufacturers to consist of two drums arranged one above the other, made of the best mild, open-hearth flange steel, and connected with 4-inch best charcoal iron vertical tubes, straight throughout their entire length, and expanded into the drums at each end, making lasting and absolutely tight joints. In the upper, or steam drum, six feet high, is an opening for the escape of waste gases, which, being reduced to a very low temperature in passing through the tubes, will impart most of their retained surplus heat to the metal sides of the passage through the steam drum, tending to slightly superheat the steam in a chamber above. The water line in this drum is about a foot above the bottom of the drum, leaving about five feet between the surface of the water and the point at which the steam is drawn off, which, the makers say, makes it impossible to carry over water in the steam in any way.

An external circulating pipe comes out from the steam drum, just below water level, and is carried down outside the brickwork, to a point just below the tube sheet of the lower drum, where it enters that drum. No steam enters this pipe, and, it is said, there is no possibility of making any, while, with the steam in greater or less proportions in the two drums, the result is a very rapid and positive circulation in one direction, on account of the greater specific gravity of the water in the external pipe, than that of the combination of steam and water in the tubes. On reaching the upper drum, the steam separates from the water, rising to the top of the drum, while the

water escapes through the external pipe. The water, it is estimated, circulates 218 times in the boiler before finally becoming steam, which secures, in addition to the rapid and steady circulation, an absolutely uniform temperature of water in all the tubes, as the fresh feed water mingles with that already in the tubes, in which the temperature is always uniform, which relieves the boiler from any destructive strains from unequal expansion.

The boiler rests on four iron brackets, riveted to the lower, or mud drum, supported on four piers of the foundation, so that the entire structure stands without



CAHALL VERTICAL WATER TUBE BOILER

contact with the brickwork, which allows the boiler to expand, without straining the brick setting. Pipe connections to the boilers, through the walls, are incased in expansion boxes. The upper tube sheet has a circular opening in its center to permit the gasses to escape through the central opening of the upper drum, so that there is a central open space between the tubes, gradually narrowing to the bottom of the tube sheet. In this opening, deflecting plates are introduced, which cause the gasses to be alternately thrown out and in, throughout the whole heating surface, giving them a sweep at nearly right angles to the tubes, thereby abstracting their heat, until they come to very nearly the same temperature as the water. In a test of ten hours

on a direct fired boiler, using bituminous coal, the boiler was run at an average of 30 per cent above its rating all the time, and the average rating of the temperature of escaping gases was 410 degrees Fahrenheit. In another test, the boiler was forced 120 per cent above its rating, delivering 330-horse-power, and at no time did the temperature of the escaping gasses reach 640 degrees.

The space occupied by each 250-horse-power boiler, set in continuous battery, is about eight feet front, for seventeen feet long. The form of construction gives a capacity per square foot of heating surface, the manufacturers say, that is unsurpassed by any other boiler. Both drums are equipped with the Cahall patent swinging man head. By taking off the nuts from them, and swinging them open on their hinges, a man can place a light in the lower drum and get into the upper drum, which is sufficiently large to admit of a man standing upright, and walk around, examining, in five minutes, the condition of every tube. In case any scale or sediment is discovered, it can be easily removed by a jointed scraper, which has four sections, and forces scale matter that may have been deposited, down to the bottom drum. The makers say, however, that it is seldom necessary to use a scraper, and that boilers in use for two years have never required a cleaner in a single tube. The lower drum being removed from contact with the fire, the presence of scale is no detriment.

Hand hole plates are put over holes in the top of the steam drum, directly opposite, and registering with "key tubes," the holes in the tube sheets into which they are expanded being $\frac{1}{2}$ -inch greater in diameter than the other holes. The key tubes are expanded into a copper ferrule, which fills out the additional space given by the larger sized holes. Should a tube need replacing, the key tube nearest it is removed and slipped out through the hand hole, and the defective tube is taken out through the holes just vacated by the key tube. The new tube is placed in position, and the key tube reinserted with a new copper ferrule. All materials are of the best quality. There is an external combustion chamber, roofed with a heavy, fire brick arch, which becomes incandescent, and radiates its heat on top of the green coal, which permits the Cahall boiler to be operated without much smoke. There is also a remarkable draft pressure, causing a rapid combustion of fuel per square foot of grate, and high initial temperature of gases.

WHEN A WHITE POLE IS NOT WHITE.

A car conductor running to Cambridge got a scathing call-down from a feminine passenger, who waded through slush for two blocks while the car waited.

"I thought you stopped at every white post!" She indignantly exclaimed. "We do, Madam," was the meek reply, and the car got across the Harvard bridge before the conductor could convince his irate passenger that according to the rules of the West End a telegraph pole covered with snow was not considered officially a white pole.

HAS DOUBLED ITS CAPACITY.

There has just been installed in the power-house of the Hammond Electric Street Railway Company, East Chicago, Ind., machinery that will double its capacity. This line is rather peculiar in respect to the patronage that it enjoys, especially in the summer. One terminal is at Roby, which is also the terminal of the Roby division of the South Chicago City Railway. On pleasant Sundays in summer, crowds of people ride to Roby and continue on the Hammond line to Hammond, a distance of seventeen miles. With only seven cars the company has many times carried 5,000 passengers on a Sunday at 10 cents a head, for it is quite a novelty to be in two states in an afternoon or morning, and return home without the annoyance that always accompanies a lot of baggage.

The new machinery consists of a 250-horse-power improved Greene engine, made by the Providence Steam Engine Company, Providence, R. I., represented by Fisher & Porter, 1025 Monadnock building, Chicago. The engine has a single high-pressure cylinder 20x36, a 14-foot 25-ton fly-wheel, with a 30-inch face, making 108 revolutions a minute. The belt is a 28-inch double-lap dynamo belt, made by Charles A. Schieren & Co., New York. The engine drives a 175-kilowatt Westinghouse multipolar generator. The line is using 350 amperes of current, with a pressure of 525 volts. This installation was put in service December 30, and gives satisfaction.

It is the intention to operate the new machinery alternately with that which has been in use for two years without missing an hour. It consists of a 19x19 Ball engine of nominally 150-horse-power, but which is only worked on an average to 100-horse-power under 190 to 195 pounds steam pressure. The engine is connected by a 14-inch belt, with a 150-kilowatt Westinghouse generator, developing 150 amperes of current, with a pressure of 525 volts. Seven cars are run over seventeen miles of track, and are heated with electric heaters requiring an average of ten amperes of current per car.

There are four boilers, two of which are 72x16, with 36 square feet of grate surface, and sixty-two 4-inch flues rated at 85-horse-power, and were made at East Chicago. The other two, 60x16, with 30 square feet of grate surface, and ninety 3-inch flues rated at 70-horse-power each, were manufactured by the Ball Engine Company, Erie, Pa. One of the Ball boilers is running with oil, and the others use coal—egg or nut coal. The oil-burner will be kept until spring in case of emergency; but the company will return to coal entirely in the spring. When all the boilers were using oil the expense was \$14.70 a day, while the expense of coal is only \$8.70 per day. Lake water is used, which is heated to 210 degrees by a Stillwell 500-horse-power heater. The barn and offices are heated by steam, the return drip going to the heater. The officers of the road are: Charles E. Griffin, president; A. M. Kaufman, Marquette, Mich., vice-president; A. M. Turner, secretary and general manager; A. J. Campbell, superintendent. J. S. Baringer is engineer.

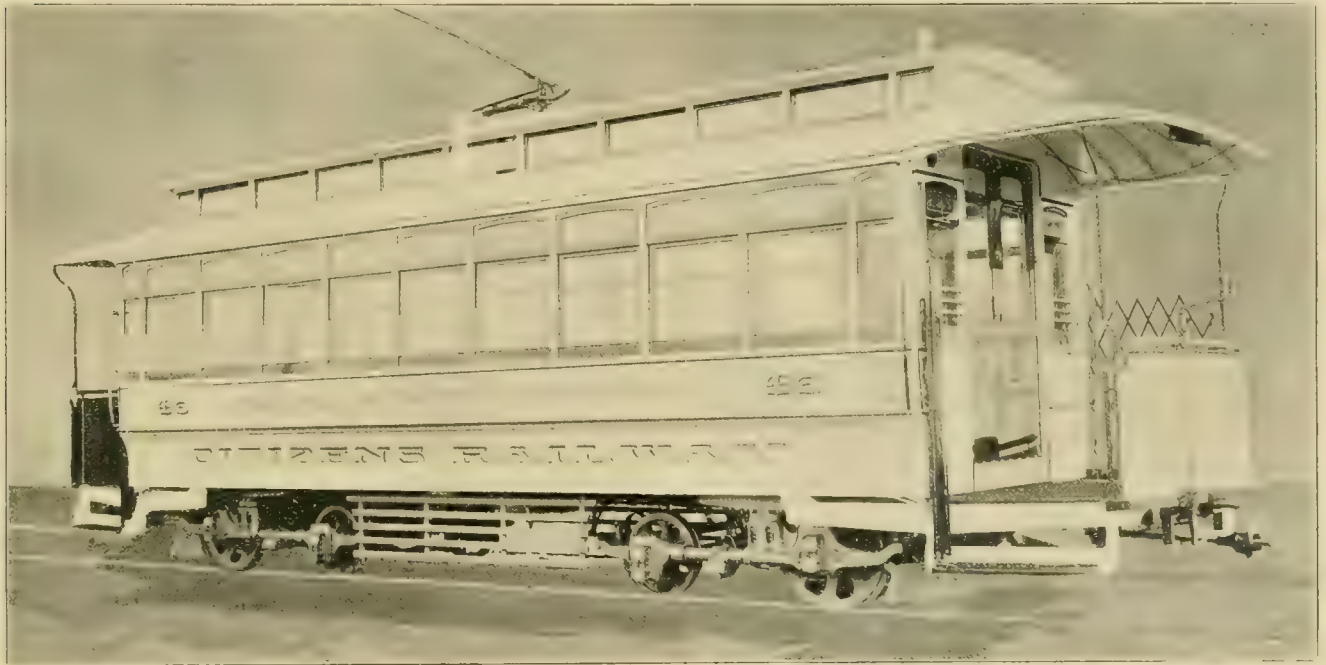
LESSONS FROM ST. LOUIS.

A Few Notes from the Electric Railway Center of the West—
Advanced Practice—Teachings of Experience.

In street railway matters St. Louis has always been in the front rank. It was there that the cable road thrived before the days of electricity, and it is there that the electric road is now seen in all its glory. The three factors that have made St. Louis street railways what they are, are progressive managers, a liberal city government and intense competition. There is not a line in the city that is not paralleled by the line of some other company. Every company is straining itself to secure a good foothold in all new territory, and to give the best possible service to people within the districts already covered. A

stop or slackened speed. Aside from these difficulties, arising from the peculiar local conditions, the service is unsurpassed in America. The St. Louis public will take electric in preference to cable cars, when two lines parallel, as has been demonstrated several times.

The evolution has been toward long double-truck cars for the most important lines, a rather striking fact since it has been in the other direction on many city lines in this country. Were it not that St. Louis is far enough south so that there is rarely any serious trouble with snow and ice, the results might have been different. The long double-truck cars are apparently the most popular with the public, and it is for this reason that they are used. As near as can be found out the movement was begun by one line which, with long cars with cross-seats, was getting all the traffic away from a line which paralleled



slight difference in speed or attractiveness of cars is enough to draw passengers one way or another. The result of all this competition has been beneficial to the public in some respects and detrimental in others. To the companies it is becoming more and more a detriment, and there is a strong feeling that a consolidation ought to be effected, although none of the many rumored negotiations tending in that direction have been successful. The bad effects of the competition, as far as the public is concerned, is most felt around the heart of the city, where the numerous switches, curves and crossings, due to the convergence of so many lines under different management, make travel very slow in comparison with what it might be if each line could have a clear right of way at the down-town terminus. The short blocks also cause frequent stops, and the fact that streets are often so narrow that a line has to go in on one street and out on another increases the number of crossings which require a

it. The latter road retaliated by putting on better double-truck cross-seat cars, and its traffic came back. The movement has grown until there are a large number of double-truck cars now running. The Robinson radial truck has been used under a great many cars on the Union Depot Railroad. The American Car Company's new truck, for use under long cars, is being extensively tried there at present under cars of that make turned out for two prominent lines. The sixty cars built for the Citizens' Railway (last month changed from cable to electric), are of the kind just mentioned, and are probably the finest and most recent development of street-car evolution in that city. Our engravings show interior and exterior views of one of these cars. They are imposing structures, seating forty passengers and rivaling steam coaches in size. Push buttons, connected with a conductor's signal bell, make it possible to signal the conductor without the inconvenience of turning around in the cross-



seats. These cars are equipped with two G. E. 800 motors.

The easy riding of the double-truck, together with the cross-seats, seems to overbalance in the public mind any inconvenience caused by climbing into the high cars.

In addition to the popularity of the long car there were certain economical reasons which led to its adoption. In a city of snow and heavy grades these reasons would not hold good. Managers reason that it is more desirable on most accounts to run one long car than a motor car and trailer. The long car takes less current, is freer from accidents and can be taken better charge of by one conductor than can a motor and trailer. The custom is almost universal of running a trailer as a smoking car behind all single truck motor cars.

G. W. Baumhoff, superintendent of the Lindell Railway, hit upon a plan several years ago for making use of old horse cars and affording the smokers a chance on every car. Two horse cars were mounted on one set of sills to make one long car. A vestibule was built between in the center with steps and side doors and the end platforms enlarged and strengthened. This makes a neat car and many are in daily use.

An important new line of the National Railway system which is to be opened in the spring, will, however, use single truck cars of the American make with interior arrangements similar to the car here illustrated.

Another reason why consolidation is so greatly to be desired in St. Louis, is on account of the present arrangement of power houses with regard to the territory served. Every power house is now transmitting current to a long distance, whereas if each station could be

assigned a territory near to it there would be a great saving in copper and electrical energy.

As is the case in any city where electric railway work began several years ago, there are plenty of the early type of double reduction motor. It is a noticeable fact that some of the old F 30 motors, well taken care of, run smoother and with less noise than some modern types of motor not so well cared for. The casing of a modern motor seems to increase rather than reduce any sounds due to loose parts.

Electric headlights are seen in abundance and variety. The reversible headlights placed under the hood, which were described by the REVIEW several months ago, are in use on the Lindell Railway. They throw a strong light down on the track ahead, and are reversed so as to light the back platform when the car is going the other way. They are the device of G. W. Baumhoff. The electrical engineer of the National Railway consolidation, Richard McCulloch, is putting on a very neat electric headlight, which is in the same position as the ordinary oil headlight on the dash board. A short distance away it is impossible to distinguish it from a good oil headlight, which fact alone ought to be convincing to those who declare that they have never yet seen an electric headlight that gave enough light on the track. These headlights take one 16-candle power lamp from each end of the car. The value of a headlight in throwing light on the track ahead seems to be very much overrated. The speed of electric cars is such that it is impossible to stop a car in time to avoid hitting any obstructions revealed in the short distance ahead that a headlight illuminates the track. The conditions approximate those on steam roads where it has long been admitted that a headlight is more of a hindrance than a help to the engineer. Its main use is as a warning signal. No one can reasonably deny that the electric headlight is a success after a visit to St. Louis.

One of the most interesting features of the St. Louis street railways just now is, of course, the continuous track, both with electrically welded and cast iron joints. It will be remembered that the three and a half miles of double track was repaired in November, at the same time that the cast iron joints were put on a mile and a half of track. Previous to that time there had been no cold weather, so that both cast and welded joints started in the winter in apparently perfect condition. The temperature has twice fallen to the neighborhood of zero. On the welded track, five or six joints have broken. On the cast joint track, one of the 120-pound joints has broken, and of a few 54-pound joints that were laid, two have broken. The cast joints break exactly at the rail ends. Capt. McCulloch, general manager of the roads on which this work was done, does not attach any importance to the breakage so far, as there has been so small a per cent that the experiment can be called a success, to date. Whether continued cold weather, or the warming up in the spring, will develop more trouble, is yet to be seen. It has been demonstrated that the expansion in summer has no evil effect in the springing or bending of the rails.



CHARLES A. SCHIEREN & CO.'S TANNERY.

It is Capt. McCulloch's idea that the laying of continuous track should take place in the coldest weather possible (late in the fall or early in the spring) so that the strains will be mainly those of expansion, rather than contraction. The company is awaiting the results with a view of relaying in the spring nine miles of cable track, now being operated as electric. If the continuous track is not a success, 60-foot rails will be used on this instead.

CHARLES A. SCHIEREN & CO.'S TANNERY.

One of the best regions in America for obtaining oak bark for tanning, is eastern Tennessee and western Virginia. The climate is very favorable to arboreal growth, being moist, and not excessively cold in winter. Long summer droughts are unknown here. As a consequence, the hills and dales are heavily timbered with deciduous trees, affording an inexhaustible supply of raw material for the lumberman and the tanner. Here it is that Charles A. Schieren & Co., of New York, have located their extensive tannery, for the manufacture of belt leather. Their Dixie tannery is at Bristol, Tenn, or rather in Bristol, Va., for the main street of the town is the boundary line of the two states, and the tannery is on the Virginia side.

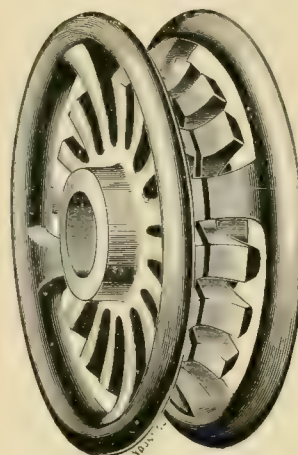
The engraving herewith gives a good view of the tannery and its surroundings. The building at the left, near the freight car, is the local office. Adjoining is the hide house, and immediately to the rear is the hair house. The large building in the middle of the grounds is the main tannery, which contains the great vats. To the right of this main building is the boiler plant, behind which is the elevated water tank. In the foreground is the storage shed for ground bark, and at the extreme right are the long sheds, filled with unground oak bark, for Messrs. Schieren & Co., do not believe in the too common practice of leaving valuable bark uncovered and exposed to rain and sun, which dissipate and weaken its tanning properties.

The hides are brought from the greatest hide market in the world, Chicago, and 60,000 heavy belting hides is the annual capacity of the plant. Eight to nine months

are required to tan a hide, and when finished it is shipped to New York, there to be cut up and made into belting of the best grades. From New York the finished belting is shipped to the branch houses of Charles A. Schieren & Co., in Boston, Philadelphia, Chicago and Bristol, Tenn.

THE EMMETT ICE CUTTING TROLLEY.

A sleet-cutting trolley which was put on the market for the first time this year and which is meeting with success is illustrated in the accompanying engraving. It is cut out on the sides and the flanges are made with sharp edges so as to let out the ice and prevent clogging. The makers guarantee that it will not clog. It is being supplied by the Thompson-Brown Electric Company, 97 High street, Boston.



Edgar Peckham and family left New York on January 10, on a visit to Los Angeles and other southern California cities. The party will go by way of New Orleans and San Francisco, returning via Denver and Chicago. Mr. Peckham will combine business with pleasure, for the western territory has recently been giving a good trade to the Peckham Motor, Truck & Wheel Company.

Map of the United States.

A large handsome map of the United States, mounted and suitable for home use, is issued by the Burlington Route. Copies will be mailed to any address on receipt of 15 cents in postage by P. S. Eustis, Gen'l Pass. Agent, C., B. & Q. R. R., Chicago, Ill.



The Ames Iron Works has moved its Philadelphia branch to 1026 Filbert street.

The Carter Brake Company is now pleasantly located at room 1331 Monadnock block.

Frederick A. Scheffler represents the Sterling Company, Chicago, in the east, instead of John MacCormack, The New York office remains at 126 Liberty street.

S. A. Lazier, Sons & Pringle, Belleville, Ont., have the rights to manufacture and construct throughout Canada the E. & M. electric railway system.

The Youngstown Bridge Company, of Youngstown, Ohio, has received the contract to build an iron viaduct 4,000 feet long from Padre Island into the Gulf of Mexico.

Frank R. Ford, of Philadelphia, has been engaged to assist Engineer Maloche, in preparing plans for reconstructing the Orleans Railroad, New Orleans, for electricity.

Stromberg, Allen & Co., the railway printers, of 337 Dearborn street, Chicago, are distributing among their friends a large wall calendar, which is a good example of their work.

Charles A. Schieren & Co., of New York, are hearing good reports of their patent perforated electric belting. Its performance under severe conditions is fast gaining it a reputation.

Edmund Saxton has been awarded the contract to construct the Ninth street line of the Metropolitan Street Railway Company, Washington, D. C. The work must be completed by August.

William Wharton, Jr. & Co., report last year to have been the largest of their experience both in volume of business and receipts. Large additions have been built and facilities increased in all directions.

The Hooven, Owens & Rentschler Company, of Hamilton, O., is installing a 100-horse-power Hamilton corliss engine in the power house of the Westport & Waldo Railway Company at Kansas City, Mo.

Alfred F. Moore, 200 and 202 North Third street, Philadelphia, established since 1820, manufacturer of insulated electric wire of all kinds and cables, has sent to his customers a large calendar with the figures two inches high.

George S. Whipp, who so successfully represents the Lewis & Fowler Manufacturing Company, of Brooklyn, N. Y., made a few trips before January 1 and gathered in orders for twenty-five snow sweepers.

The Okonite Company, Limited, New York, at its recent annual meeting, received reports from the several heads of departments showing that a good business had been transacted during 1894, and that the outlook for 1895 is still better.

The Genett Air Brake Company, of New York, is completing an order for twenty-five additional air brakes for the Buffalo, N. Y., Railway Company, which order was received after the severest kind of a trial of the original equipments installed there.

One of the oddest souvenirs of the holiday season is that of the American Electrical Works, Providence, R. I., New York, Chicago, Montreal. It is a small mirror fastened to a card, in which appears the likeness of the customer who has "first place" in the company's "esteem."

The John Stephenson Company, Limited, of New York, has just finished a large order of standard cars for the Broadway & Seventh Avenue Railway Company, of that city. This makes a total of 200 cars furnished by the Stephenson Company to the Broadway cable road.

The Broadway & Seventh Avenue Railway Company, of New York, has decided to abandon its old wire guards on the steps of its cars and replace them all with the Pitt gate. Tests of gates furnished by the William R. Pitt Composite Iron Works, of New York, proved very satisfactory.

T. D. Hoskins, of the Hoskins Traction Company, San Francisco, will equip several cars of the San Diego street railway system with Hoskins' electric vapor motor. The motors are said to give forth no odor and comparatively little noise, and to be capable of hauling one or two trailers at the rate of eight to fifteen miles an hour.

The Wason Manufacturing Company, Springfield, Mass., has been turning out some new and improved cars for every description of motive power. The company looks back with pride on its establishment in 1845; and during all these years has always been progressive, constantly adding improvements to its output, which has always maintained a high standard.

The Electrical and Mechanical Engineering & Trading Company, of 39 Cortlandt street, New York, has almost doubled the number of its customers during the year. The Vail rail bond has been brought out, also a track feeder system furnishing a complete metallic circuit for electric railways. The company has also worked out

the problem of the application of the "booster" system to electric railways. A contract was recently closed by the company with the trustees of the New York and Brooklyn bridge for equipment for lighting their sixty cars with electric current from an overhead trolley. A large sale of first-class supplies to old roads is expected in 1895, as well as a reasonable amount of new business.

The Allerton Lubricant Company, Old Colony building, Chicago, is having even greater success than it expected with its grease. Companies that have tried them are ordering again. The street railways that have used them are favorably impressed with their value, and continue to place additional orders. The St. Joseph Traction & Light Company, St. Joseph, Mo., has taken a trial order, and the Alley L road, Chicago, reports satisfactory results from the lubricants of the company.

The Consolidated Car Heating Company, of Albany, N. Y., has had its attention attracted to a new field for the employment of electric heat, the heating of steamships, for which its regular forms of street car heaters are said to be well adapted, though it is furnishing special forms of heaters where desired. The company is already in communication with over a hundred steamship builders in this and other countries upon the subject of electric heating.

James H. Garrett, who for a year and a half has been engineer for J. Holt Gates, has become Chicago manager for A. L. Ide & Son. Mr. Garrett will represent the firm in northern Illinois and Wisconsin, handling its self-oiling, single valve, simple and compound Ideal engines. His office is 208 Home Insurance building. Mr. Garrett has a wide experience and has served as engineer of the Northwestern Thomson-Houston Company, United States Electric Lighting Company, and Anaconda Mining Company.

The R. D. Nuttall Company, of Allegheny, Pa., has received information from one of its customers that a number of the Nuttall trolley wheels have run 22,000 miles, and are still in first-class running order. This is said to be the best record that has ever been made by any trolley wheel in the market. The foreign business of the R. D. Nuttall Company is growing very considerably. The company has filled an order for "improved trolleys" for a street railroad in Paris, France, and another similar order is being filled for a road in Belgium.

C. E. Sargent, the well known engineer and successful salesman, will represent the Ball & Wood Company, New York City, manufacturers of improved automatic cut off engines, with an office at 401 Home Insurance building, Chicago. Mr. Sargent made a large record of sales for the engine builders with whom he was formerly connected and he certainly ought to do as well, if not better, when he has such an excellent engine as the Ball & Wood to offer his numerous friends and acquaintances. Besides a long experience as salesman, Mr. Sargent

enjoys the advantages of a good technical education, having been graduated from Blackburn University in 1882 and from the University of Illinois, as mechanical engineer, four years later.

The fame of the Peckham truck has extended even to California, whence a second order for sixty-five trucks was recently received from the Southern Pacific Railway Company, San Francisco, and from the Mt. Lowe Railway, Pasadena. The excellent performance of Peckham's trucks have won third orders from the Chicago General Railway, Hestonville, Mantua & Fairmount Passenger Railway, Philadelphia, and People's Traction Company, Philadelphia, the latter being a large order. The Peckham Motor Truck & Wheel Company, of New York, has also received orders from the Syracuse & East Side Railway, Syracuse, N. Y., West End Railway, Boston, and the Broadway & Seventh Avenue road, New York. The last mentioned was a second order for seventy-five trucks.

The Peckham Motor Truck & Wheel Company, New York, ran its works at full capacity during the entire year. Over 2,000 Peckham trucks are used on cable and electric roads in New York, Brooklyn, Jersey City, Hoboken and Philadelphia, which have adopted them as standard after thorough trial. Among these are the Atlantic avenue road, Brooklyn, the Consolidated Traction Company, Jersey City, People's Traction Company, Philadelphia, and Metropolitan Street Railway Company, New York. The Peckham Company has brought out during the year the Excelsior truck, trailer truck, spiral spring extension truck, elliptic spring extension truck, and the No. 10 swivel truck for long cars. The chief feature of the company's work the past year has been the care given to small details of construction.

James W. Godfrey, for eight years general manager of the New York Insulated Wire Company, will hereafter manage the sales of the India Rubber & Gutta-Percha Insulating Company, manufacturers of Habirshaw standard cores, white core, insulated wires, cables, etc., with headquarters at room 52, 15 Cortlandt street, New York City. Mr. Godfrey has a clean, honorable and successful record, which has made him many friends, who will certainly stand by him in his new connection. F. W. Harrington and J. B. Olsen are also connected with the India Rubber & Gutta-Percha Insulating Company, and will attend to the wants of the trade as heretofore. The wires of the company have stood a rigid test, which has proven them to be of a very high grade, made on scientific principles, and on improved machinery, under the personal supervision of W. M. Habirshaw.

Charles J. Mayer, Betz Building, Philadelphia, has done a much larger business than he expected during the year just ended, and reports that the outlook is "very good indeed" for staple supplies and new construction during the coming season. Mr. Mayer has

taken his cousin, H. Mayer, formerly of the Westinghouse Manufacturing Company, into the business. He expects to increase facilities and open a warehouse. In addition to handling the R. D. Nuttall Company's specialties Mr. Mayer has secured during the year the Nelson insulated overhead crossings, etc., and the Cochrane electric heaters, made by the Reliable Manufacturing Company of Boston. He has closed several large contracts with the Philadelphia Traction Company for overhead material, and has furnished all the overhead material for the Hestonville, Mantua & Fairmount Railway Company.

The Mather Electric Company, of Manchester, Conn., has under construction, on orders, five 200-kilowatt, twelve 100-kilowatt, one 80-kilowatt, eight 60-kilowatt, three 45-kilowatt, and three 30-kilowatt belted generators of its new multipolar type; also three 100-kilowatt, one 80-kilowatt, two 65-kilowatt, two 50-kilowatt and one 30-kilowatt new multipolar direct connected generators; also thirty-one ring type dynamos and seventy Manchester motors of various sizes. Notwithstanding the extensive additions in the way of new tools and facilities, the company has had to run its plant twenty-four hours a day the past two months with two shifts of men. With all the effort orders continued to accumulate. The first three days in January the company closed contracts for ten generators aggregating 1,300 kilowatts. The Mather Company considers the outlook for 1895 very bright.

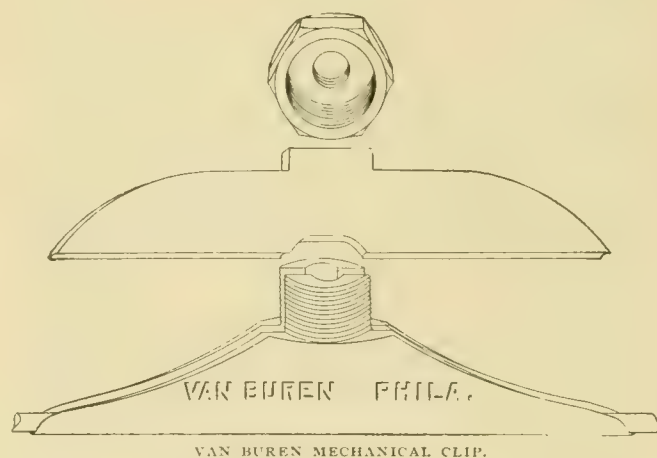
The General Electric Company is compelled by the increase in electrical business to enlarge its already extensive establishment at Schenectady, N. Y. One of the two buildings now being erected is a storehouse 353 feet long and 52 feet wide. The foundations are already laid and the superstructure is rising rapidly. This will relieve the smaller storehouses now found entirely inadequate. The other building will be used as a laboratory for standardizing. It will be erected on the very outskirts of the tract of land owned by the company at Schenectady, in order that it may be as far away as possible from the disturbing influences of moving iron and heavy electric currents in and around the many buildings of the plant proper. This laboratory will contain all the standard instruments of the company, and with these the working instruments, which are in use throughout the the factories for testing purposes, will be compared each day.

The proper lubrication of heavy machinery developing great power is a question demanding careful attention. That lubricant which most successfully overcomes friction and preserves the parts from wear is in the end the most economical, unless its cost is altogether out of proportion. A prominent engineer once said: "The more solid the lubricant that can be used in any place the better the lubrication." Pure flake graphite is said to be the only form of graphite which insures perfect lubrication, and the only mines from which an absolutely

uniform flake can be obtained are said to be at Ticonderoga. The question of protecting electric railway poles from rust, and covering unsightly stains, requires the careful consideration of managers. To test paints offered by several manufacturers the Topeka Railway Company, of Topeka, Kan., divided its poles into six lots and used six different kinds of paint on them. After eighteen months, only the lot painted with Dixon's silica graphite paint was in first-class condition. More of that paint was at once ordered for repainting some of the other sections which sadly needed attention. The Dixon Crucible Company, Jersey City, N. J., will gladly send a sample and an interesting pamphlet on lubrication to anyone interested in the subject.

VAN BUREN MECHANICAL CLIP.

Many of the Philadelphia street railway companies use a clip that is adapted for use in many different circumstances, requiring no solder. There are three parts—shoe, or running surface, tongue and nut. When they are clamped together, it is said, they have a vise-like pressure on the wire, holding the line firm without solder. It is also said to be straight-under-running, making no bump, and to last about two years. It is known as the Van Buren mechanical clip, manufactured



by H. Van Buren & Co., 2015 Carlisle street, Philadelphia.

The manufacturers say the clip will make a splice without any solder, by battening the ends of wire a little, and that it can be put on in about one-fifth the time required for placing solder clips in position. The parts are all interchangeable, so that when one wears out or becomes broken it can easily be replaced at a small cost, while the other parts need not be thrown away. In Philadelphia, where the clips are in use on all the electric roads, the manufacturer reports them to be giving satisfaction. No special tool is required, as any ordinary wrench or pipe-tong can be used to put them on. They are made in various sizes for feeds, anchors, or strains, pull-offs, with special splicing clips for a permanent splice.

STREET RAILWAY EVENTS OF 1894.

JANUARY.

Montreal Park & Island Railway opens, January 1, between Montreal and Sault au Reccollet.
Interstate Street Railway plant, at Attleboro, burns January 2.
Columbia & Donegal Electric Railway opens January 3.
Isaac T. Van Duzer, who built the first street railway in New York City, dies at St Paul, January 4.
Baltimore & Washington Turnpike & Tramway Company organizes.
Pottstown, Boyertown & Reading Electric Railway lets a \$100,000 contract.
Cleveland, O., Electric Railway Company's barns burn January 13.
Northwestern Elevated Railroad, Chicago, secures its franchise.
William H. Allen dies January 15.
STREET RAILWAY REVIEW celebrates its third birthday.
Northwestern Electrical Association meets at Milwaukee, January 17 18.
Executive committee of American Street Railway Association meets January 24.
Texas Street Railway Association meets January 24.
Cars are burned at Ann Arbor, Michigan, January 25.
Midwinter Fair opens at San Francisco, January 27.
Telephone patent expires January 30.

FEBRUARY.

Massachusetts Street Railway Association meets February 1.
Cincinnati Consolidated Street Railway shops burn February 2.
Maine Street Railway Association meets February 7.
Albert S. Rosenbaum dies February 16.
Hiram R. Rhoads, of Williamsport, Pa., dies February 17.
Car barns and power house at Albany, Ore., burn.
Mrs. Josephine Smith, of New York, dies February 23.
Eighth street line, Cincinnati, opens February 28.

MARCH.

Thomas Corrigan, of Kansas City, Mo., dies March 1.
Neville Island & Corapolis Street Railway opens March 1.
Albert Gallatin and Horatio Livermore buy the electric railway at Sacramento, Cal.
Milton H. Hamilton dies at Pittsburg, Pa., March 10.
Consolidation of Lehigh Valley Traction Company and Allentown & Bethlehem Rapid Transit Company of Pennsylvania.
Missouri Street Railway Company's car barns at St. Louis burn March 20.
Cleveland, Ohio, Electric Railway Company's shops burn March 21.
J. L. Barclay dies at Pittsfield, Mass., March 26.
Hamburg, Germany, Electric Railway commissioned March 30.

APRIL.

Connecticut Street Railway Association meets April 3.
William H. Goodrich, of Hartford, Conn., dies.
Washington & Arlington Railroad Company's property sold April 14.
Cayadutta Electric Railway plant at Gloversville, N. Y., burns
Nassau Electric Railway Company of Brooklyn lets contracts for 100 miles of railway.
Gen. Henry W. Slocum, of Brooklyn, dies April 14.
Baden & St. Louis Railroad welds its track.
Chester Traction Company consolidates the Chester Street Railway, the Union, the Chester & Media and the Chester, Darby & Philadelphia companies.
United Electric Railway at Nashville sold by auction April 18 to Nathaniel Baxter, Jr.
Windsor Beach Electric Railway near Rochester, N. Y., opens April 20.
Newburgh Electric Railway incorporated at Newburgh, N. Y.
J. C. Hubinger buys Gate City Electric Street Railway at Keokuk, Ia., April 28.

MAY.

M. Stephenson dies at Montreal, Que.
New Jersey Traction Company incorporated at Trenton.
First electric car over Mississippi river at Davenport, May 4.
Kansas City Cable Railway Company, Grand Avenue Railway Company and the Kansas City & Independence Rapid Transit Company consolidate.
Electric railway opens between Middletown and Goshen, N. Y., May 7.

First electric car runs over One Hundred and Thirty-fifth street line in New York City, May 7.

Street railway at Stillwater, Minn, sold May 7.
Dr. William T. Barnard, of Chicago, dies at Washington, May 10.
Bridgeport, Conn., Electric Railway construction begins May 14.
Geneva, N. Y., Street Railway begins running May 15.
John H. Dalzell, of Pittsburg, dies May 29.

JUNE.

Cayuga Lake Electric Railway begins running June 1.
Michigan Street Railway Association organizes June 5.
Twenty-third Avenue Electric Railway, of Oakland, Cal., and the Oakland, San Leandro & Haywards Electric Railways are consolidated.
Court Street & East End Railway and West Side Street Railway consolidated at Binghamton, N. Y.
Newburgh, N. Y., Street Railway opens for traffic June 9.
North Chicago Street Railroad Company connects with Evanston electric line June 9.
Monterey & Pacific Grove Railway barns at Pacific Grove, Cal., burn.
R. W. Hunter buys Overland Electric Railway at Nashville, Tenn.
William C. Wilcox, of Utica, N. Y., dies
Metropolitan Street Railway Company, Metropolitan Crosstown, and Lexington Avenue & Pavonia Ferry Company, of New York, consolidated.
City & Suburban car shops at Portland, Ore., burn.
C. E. Healy drowns at Detroit, June 24.
Mail cars placed in service on Atlantic Avenue Railroad, Brooklyn, June 25.
Thomas A. Roberts dies at Augusta, Ga., June 27.
Last horse car at Reading, Pa., taken off June 27.
Altoona & Logan Valley Electric Railway opens branches to Bellwood and Gaysport, Pa., June 28.
Massachusetts Street Railway Association meets June 28.

JULY.

Waterbury, Conn., Traction Company adopts electricity July 1.
City of Glasgow, Scotland, takes possession of tramways July 1.
Pennsylvania Traction Company buys Columbia & Donegal Electric Railway July 1.
Nebraska Street Railway plant, at Nebraska City, Neb., burns.
Metropolitan Elevated Railway at Chicago lets electrical contracts.
Northwestern Electrical Association meets at St. Paul, Minn., July 18, 19 20.
C. St. Michel, of Quebec, dies July 23.
Central Railway Company's barns, at Peoria, burn July 27.
Bloomfield car barns of Consolidated Traction Company, Newark, burn July 27.
Capt. Allen Tindolph, of Vincennes, Ind., dies July 27.

AUGUST.

F. A. Soule, of Chicago, dies.
J. J. Burns buys Hatch & Chadwick's lines in Goshen, Ind.
Thomas M. Sayre dies at Jersey City.
New York & Philadelphia Traction Company incorporated at Trenton, N. J.
Col. F. H. Meyers, of Oakland, Cal., dies
Maine Street Railway Association meets at Rockland, August 16.
T. Hackworth Young, of Chicago, dies.
Payson K. Andrews dies at Chicago August 22.
Cortland Omnibus & Car Company begins building street cars August 25.
George B. Shaw dies August 27.
Conti compressed air experiments begin at Westfield, Mass.
William J. Stephenson, of Washington, D. C., dies August 31.
Gas explosion in power house of Citizens' Street Railroad, Indianapolis, August 31.

SEPTEMBER.

Pennsylvania State Association meets at Reading September 5 and 6.
Indianapolis & Broad Ripple Rapid Transit opens August 14.
Mission Street Electric Railway, San Francisco, opens August 15.
New York Street Railway Association meets at Syracuse, August 18.
Michigan Street Railway Association meets at Grand Rapids, August 19.
Market Street Railway Company, San Francisco, buys Metropolitan Railway.
Ohio State Tramway Association meets at Toledo, August 26.
Philadelphia Traction Company opens Girard Avenue line August 27.

OCTOBER.

Last horse cars discarded at Cincinnati, October 1.
 Allegheny, Etna & Sharpsburg Electric Railway Company opens a new line at Allegheny, Pa.
 Rochester Railway Company and Rochester Electric Railway Company at Rochester, N. Y., consolidate.
 Cortland & Homer, N. Y., Traction Company lets contracts.
 Amalgamated Association of Street Railway Employees meets at Milwaukee, Wis., October 8.
 American Street Railway Association meets at Atlanta, October 17.
 18, 19
 Georgetown, Ky., car barns burn October 19
 Hamilton, Ont., Electric Radial Railway buys Niagara Central Railway.
 Three-wire system tried at St. Louis.

NOVEMBER.

Fire destroys Allegheny Traction Company's barns at Pittsburg, November 3
 A. W. Ockabock buys Grand Island, Neb., Street Railway.
 Poughkeepsie, N. Y., thirty-mile electric line goes into operation.
 Johnson Company starts an electric road from Lorain to Elyria, O.
 Elwood, Ind., street railway plant is wrecked by boiler explosion, November 16.
 George D. Teller, oldest conductor in the United States dies at Buffalo.
 City Railway Company of Wilmington, Del., opens a new line to Gordon Heights.

DECEMBER.

Oden Bowie, of Baltimore, dies December 4.
 Francis J. Callanan, of Union Traction Company, is killed at Rutherford, N. J.
 East St. Louis, Ill., car barns burn.
 John Worthy, of Chicago, dies December 12.
 Car house of North East Street Railway at Kansas City, Mo., burns.
 Roscoe street power house of North Chicago Street Railroad goes into operation.
 The REVIEW reviews the year with its advertisers.

NEW PUBLICATIONS.

The Sargent Company, of Chicago, has gotten up a neat little brochure of ten pages, setting forth the advantages of the Sargent brake shoes, which are shaped so as to counteract the wear of the rail on the wheel.

The "Sixth Annual Report on the Statistics of Railways in the United States" comes to hand much earlier than former reports issued by the Interstate Commerce Commission. Its 600 pages contain a vast quantity of facts and figures relating to every steam road in the Union.

Electric Light and Power, by Arthur F. Guy; Biggs & Co., London, publishers: Price, \$1.20. This purports to be "the result of practical experience in central station work," but on perusal it is found to be a very full exposition of the principles of electrical machinery and apparatus.

The Electrical Trades' Directory and Handbook for 1895, is now in preparation by the Electrician, London. The directory will contain a comprehensive list of electrical supply and construction firms in Great Britain and the colonies, useful tables relating to electricity, and biographical sketches of over 250 eminent men connected with electrical industries.

Electric Railway Motors, by Nelson W. Perry, is a little book published by the Street Railway Gazette, New York. It is intended mainly as an instruction book for motormen, and is commendable as being the first book published with that express object in view. There was certainly need for something of the kind, and Mr. Perry is admirably fitted to take up the subject.

Poor's Directory of Railway Officials of November, 1894, devotes sixty-four pages to the street railways of the United States and Canada. In addition to the names of officers, there is given a report of the finances of each company and a statement of the mileage and equipment. It will prove valuable to investors and supply men, as the reliability of Poor's work is established.

Electric Railway Data for Construction and Dividends is the title of a neat little pocket book for the use of those who wish to gain an approximate idea of the material and cost of material employed in electric railway construction. It is issued by L. W. Serrell, M. E., contracting engineer, Postal Telegraph Building, New York, and is intended as an aid to those new in the electric railway business.

Part XII, 1895 edition of the Consolidated Car-Heating Company's catalog has been issued from the general offices at Albany, N. Y. The illustrations show the complete heater, heater placed in car, temperature regulating switches, resisting conductor coil and car wiring diagram. Figures are given to show the cost of electric heating and results are reported in detail from several roads using them last winter. A table of great value for reference is given on the cost of electrical energy.

The Commercial and Financial Chronicle, New York, has favored us with a copy of its Investors' Supplement, which is published every two months, on the last Saturday of January, March, July, September and November. The supplement contains information on the financial affairs of various corporations. A new departure, is considerable space devoted to the street railways of the United States, which gives this class of information more frequently than is done by any other medium.

THE New Science Review is a new quarterly magazine which aims to present in a popular style the latest developments of science. A broad view is taken of science, some of the contributions to its columns being more interesting than scientific. It furnishes the general reading public with the exact information that has heretofore been found only in more abstruse publications. The new magazine is conducted by J. M. Stoddard and published by the Transatlantic Publishing Company, New York.

The Columbian Equipment Company, recently organized, with offices at 66 Broadway, New York, has just purchased the Highland Avenue & Belt Railroad and the Gate City line, both in Birmingham, Ala. Improvements will at once commence. Steam dummies now are the motive power, but the Highland Avenue line will soon be equipped with the electric trolley. An extension of this line is projected. The officers of the Columbian Equipment Company are Wayland Trask, president; Charles A. Avery, vice-president, and Clarence E. Stump, secretary and treasurer.



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Editor.

F. S. KENFIELD,
Business Manager.

CORRESPONDENCE.

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

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NO. 2.

THE use of incline railways is steadily increasing in connection with other electric railway enterprises. The great convenience of electricity as a motive power for such railways is the secret of their growth in the last few years. An article reviewing European practice in last issue is full of suggestion to those embarking in such enterprises.

THE economy of the electric lighting of electric railway cars has, strange as it may seem, been called in question. If power costs a road three cents a car mile, electrical energy will cost it about three cents per kilowatt hour. This will make the cost of lighting ten 16-candle-power lamps on a car at 1½ cents an hour. Renewals will add a half cent more. We have yet to hear of the lighting system that can maintain 160 candle-power of light on a car as cheap as this.

THERE is nothing like an electric street railway system to put life in a town. Take Philadelphia, for example, which has always had the reputation of being asleep. Now that the trolley is in operation, the newspapers are advocating an ordinance prohibiting the use of the tracks to wagons. They even go so far as to demand that it ought to be possible to punish any delay of a car by a loaded wagon on the rails. That the riding public would unanimously favor the passage of such measures, which are in force in many cities, there is no dispute.

GERMANY is now entering on a period of great activity in electric railway construction. There does not seem to be the unreasoning conservatism in regard to them that exists in some places, (notably in England) and now Germany is to have electric roads in abundance. Being an older country it was but natural that the change from horses to electricity would not come as quickly as in America, but a very creditable enterprise is being shown and the Germans evidently know a good thing when they see it. A great deal of American apparatus is going in and that built in Germany for this purpose follows closely American lines. The details are also those that have been found by American experience to be the best.

AMONG the nuisances that beset winter traffic in places where there are steep grades, is that of coasting. Regardless of the danger, which seems to make the sport more attractive than otherwise, the youth persist in choosing those places which take them in the vicinity of the street railway tracks. If there be an accident, as there have been several this month, the street railway company is blamed, because if its car had not happened along at that moment no one would have been injured. Accidents can be prevented by adopting the plan of the Southern Electric Railway Company, St. Louis, which sprinkled two barrels of salt in the road crossing its tracks, thus stopping the bobs before they come near the tracks. This is a simple expedient, which costs very little money, yet will probably prevent a great many personal injury suits.

IF the plan advocated by a Grand Rapids, Mich., newspaper is adopted by the street railways, it will make service less efficient. It is proposed to make the motorman keep track of all who enter and leave cars, compelling entrance and egress through the front door. The plea is that the conductor has enough to do to collect fares. As the motorman has got to keep his wits about him in order to run his car safely and avoid accidents, he has all he can comfortably do to do his work as it should be done, and no extra burden should be placed upon him. The conductor, however, has little else to do than to watch the passengers, for having located the new comers, it is no great strain on his intellect to keep them in mind until he has collected their fares, leaving his attention alert for the extra duties that it is desired to impose upon the motorman whose attention is necessarily constantly engaged with his trying work.

IN Toronto, the question is being agitated of utilizing power from the trolley wires for operating the fire engines. This has already been considered in other cities, but can hardly be looked upon as a wise move. There are very many purposes for which current from railway wires may be used with advantage and economy. So highly important a matter as the reliable working of a fire engine, however, is not one which may safely be adopted. The trolley wires may not be sufficiently near the scene of conflagration to be of use; or the wires may

be severed at any moment by a falling wall; the electrical machinery is more delicate than that of the steam engine; and, worst of all, what if the power house itself should be the object of the fire department's efforts! Electric cars have given the fire department many a timely lift in assisting to draw apparatus to fires, but we doubt the advantage of the proposed plan.

ONE finds it difficult to discern and comprehend the reasons which enabled a New York court to decide that a nickle dropped on the floor of a car through the wooden mat and hidden under the slats, pays a passenger's fare, and he is not bound to pick it up. The court says it pays the fare the same as if it was handed to the conductor, who must return the change, if the coin be of greater value than legal fare. It looks to us as if this decision if carried out in business transactions would lead to foolish results. Under it a man could pay his grocery bill by dropping the money on the floor, if he could prove that he had done so, and if a third party picked it up and put it in his own pocket, the grocer could not recover, even if he had no knowledge of the transaction, because the money having been dropped on the floor of his store was in his possession, and therefore the bill was paid. The same laws of common sense ought to apply with reference to quasi-public corporations as it does to private individuals, yet it does seem as if the public goes crazy whenever it attempts to regulate something in which it has no concern.

THE Building Trade's Council in St. Louis has set a most worthy and sensible example in abolishing the office of "walking delegate," and also adopts a new constitution in which is stated that strikes are failures and boycotts un-American. Hereafter, arbitration will settle all differences. When any organized body of workmen place themselves on record on so high and commendable a basis as the St. Louis Building Trades have done, they will find employers more than ready to meet them half way. Labor organizations when wisely managed are capable of great good not only to their members but to employers, but the curse of labor unions has too often been officious, selfish and incompetent officers who like the walking delegate seem to think they are not earning their salary or making a record unless they are making a visible show of battles won, and in order to gain a victory create dissension and trouble in times of peace. Their course has been very like casting one into a treacherous river in order to have an opportunity to save the life so put in jeopardy. The wise man is he who follows safe paths and sees that the defenses are kept up so none may through any accident fall into the stream.

OUR Pennsylvania friends now have genuine sympathizers throughout Connecticut, where an interurban road has given up its express service, under pressure brought to bear by the Adams Express Company. The express company claims violation of its chartered rights, under the law of 1893. The action of the express com-

pany is a short sighted one, for, while in special cases it may suffer, and undoubtedly has, from the electric railway competition, yet in the long run, the fast increasing number of electric interurban lines is destined to create a large volume of business for the large express companies, which they never had, and never would have, but for the electric lines. Again, the frequency with which electric cars are operated, and the reasonable rates at which they handle parcels and light freight, have already been highly appreciated by the public, and one of these days, the law enacted expressly in the interests of the steam road carriers will be wiped from the statute books. The people do not have so high a regard for the old line express companies that they will long submit to the delays, extortionate rates, and restricted competition which is claimed under the law in question. A display of wisdom on the part of the express carriers would be to join hands with the interurbans and arrange an exchange basis whereby both would be benefitted. This is the inevitable outcome, and the longer the old companies defer it, and the greater their opposition, the better will it be for the electrics, which will, meanwhile, be a large sized thorn in their ironclad sides.

A FAIR specimen of English criticism on American electric railway practice, is found in the *Electrical Review*, of London. In the course of a long editorial, it says: "Belt driving, for railway generators, seems at last to be condemned in America, and direct driving adopted, a practice European engineers fell in with years ago." For the sake of information, we would like to know of any important railway stations using direct driven generators, either in England or on the continent. The two largest railway power plants in England, the City & South London underground, and the Liverpool elevated, are not direct driven, although the latter was but recently erected. Further on, the *Review* says: "We feel certain that when electric traction moves in this country, British engineers will not copy the details of American practice, but will work out the problems in their own way. Electrical engineering methods differ considerably here in engines, dynamos, and motors, from those of the States, and in electric traction the same differences may be expected." Very well, if they do not want to make use of the results of our experience, we do not want to force them, and can only wish them much joy in working out the "problems" that come up, and in passing through the school of experience from which we have graduated. We are not desirous of going through the same school again. The tuition is too high. Germany has adopted American practice, and English engineers will make use of our experience, unless their vanity is too great to allow of this. We trust that the paragraph quoted does not voice the sentiment of the majority of British electric railway men.

If the example set by the manager of a street railway in Leavenworth, was more generally adopted and as promptly acted upon there would come a regular epi-

demic of cold chills to certain city officials in many places. Few of our readers but will know to what we refer. The sarcastic politeness with which many persons enjoying a temporary authority, suggest favors big and little, is an old story. Some of these demands are wholly within reason and amount to no more than is entirely warranted as an exchange of courtesies between the road and the officer, each of whom are in position to favor the other. City officials can frequently be of great service in expediting permits to open streets for repairs, and the like, in which they not only render valuable assistance to the company, but indirectly to the public which might be seriously inconvenienced by any delay. These and many kindred favors are really no more than the company deserves, occupying as it does, the position of practically a public institution. It is not against ordinary reciprocity that we rebel, but when a city official so far forgets himself and his position as to make threats of sandbagging a company which declines to longer endure his demands a limit has been reached, and the prompt and outspoken action of the manager in the case mentioned in another column is a fitting and startling rebuke which might be acted on elsewhere in a similar manner, to advantage. The manager occupies a trying position. He has to please his stockholders; to maintain friendly relations with his employes; satisfy the great public, and try to hold the city officials as closely as possible to what the city's rights are. Each of these four interests are inclined to view their special claim as a paramount claim. As a rule it is cheaper and less vexatious, and often impossible to do otherwise than meekly submit to the exactions of city officials, however unjust they may be, but the manager when forced to the wall, as in Leavenworth, has a strong case with which to strike back. It must be a question of local conditions wholly, as to which is the wisest course to pursue, fight or submit.

"It's all in the family," said a street railway man the other day, when the question was being discussed as to whom, among several members of a company's staff, belonged the credit for the conception and working out of an important idea. That one sentence revealed a state of feeling among the higher employes of that company that is of inestimable value to that company, and it is within the writer's personal knowledge that the economy of operation and the progressiveness of practice which has always characterized that road is in a large measure due to the fact that the brotherhood feeling is thoroughly cultivated among the leading men in all departments. Meetings are held regularly for the discussion of questions of street railway operation, and everyone is expected to contribute his ideas. All work together, and feel a mutual interest in the operation of the system. The discussion of the plans to be pursued in operation are not confined to a favored few behind the locked doors of the president's office. This does not mean that all the affairs of the company are scattered broadcast, but that every employe worthy of the trust is made to feel that he has a personal responsibility, and that his ideas, if they are

good ones, will be considered, with credit to himself, and possibly adopted. A manager who conducts things on this plan has at hand a mine of available information as to details of operation, and that he would not otherwise have, which is of great use to him in conducting a road. There is, furthermore, none of that fatal trouble among employes whereby every man is trying to cut some other man's throat. It is a noticeable fact that it is in the companies where there is the most secrecy on the part of the management that there is also the feeling just mentioned. It is also noticeable that in such companies positions are held by "pull" rather than by actual merit. Nothing creates faithful servants like the knowledge that real excellence will be rewarded. The minute the feeling is spread that this will not be done, away goes the discipline of the unfaithful and the co-operation and true support of the faithful employes. Give the men the feeling that "we are all working together for the good of the road." Those who fail to enter into this spirit when encouragement is given are not the kind that it is desirable to keep on the pay rolls. When a manager cannot trust his men, and admits it, it is a confession of his own inability to select good ones.

THE Connecticut legislature have enacted a law forbidding hereafter the crossing at grade of steam and electric road tracks. Several roads, which were about to make such crossings, succeeded in laying tracks before the bill passed the senate. The road at Bridgeport was restrained by injunction, which the judge refused to remove until the day following the passage of the law. The Bridgeport people, who insist the injunction was unjustly issued, and which the judge admits by dismissing it, are inclined to complete their tracks by laying the grade crossings which were delayed by the injunction, and taking the issue to the supreme court at Washington. As, in the nature of things, there will be practically no more steam road building of consequence in Connecticut, and, what little there may be, is not likely to cross then existing electric roads; and, when on the other hand, it is seen there must be a large amount of new electric lines, which will cross the steam roads, the whole situation simmers down to a very clever piece of legislative diplomacy on the part of the steam lines. Hereafter, it will be almost impossible to so route an electric line of any consequence so as to avoid crossing a steam road. The electrics must follow the location of population, and at such points the steam road is already in on the ground floor. Hence, the entire burden of elevated crossings is dumped upon the electric lines. The reason for this is obvious. It is a part of the energetic policy adopted by the Connecticut steam roads, in their temporarily successful efforts to throttle and stifle the inevitable competition, not only in passengers, but in carrying express, freight and mail. This growing competition, so popular with the public, and furnishing a service, the frequency of which the steam roads are absolutely powerless to meet, stares them in the face like a nightmare. Anything and everything they can do to hamper and hinder construc-

tion of new lines, and to limit and curtail otherwise possible and certain earnings, is all fair to them in the war they wage. But time, and not such a very long time, will settle these matters, and there can be but one ultimate result. As to the grade crossing problem. There are, beyond doubt, some such crossings in Connecticut and many other states, which are little less than criminal. Conditions exist which invite disaster which has already or will some day surely come. At such points mutual protection should unite the steam and surface roads in a track elevation or depression of one or the other of them. In nearly every case, the surface road is the track which can best be changed, but as injured persons have equal claims at law against both companies it would seem both should share in the cost of the additional construction. The actual number of positively dangerous grade crossings when compared to the whole number, is, however, small, except where several tracks are included in one crossing.

GROOVED RAIL AT CINCINNATI.

Those cities that are considering the passage of ordinances requiring the use of a grooved rail may be interested in the following editorial which appeared this winter in the Cincinnati Commercial Gazette. As coming from a publication which would naturally be inclined to favor the grooved rail, it ought to be a convincing argument against such a rail for our American cities.

"Somebody invented what is known as the groove rail for street railroads. It was favored by the city because of the advantages to wheel vehicles on the streets, and it was laid down on some of the lines of the Consolidated Street Railroad. But a snowfall upset the calculations of the inventor and the expectations of the city authorities. The snow filled the grooves and solidified there, thus throwing the cars off the tracks, blockading the roads, and leaving passengers in a state of disturbance as to how they should reach their homes. A vast amount of discomfort was caused by this on Wednesday and Thursday evenings, and the application of salt to the groove-hidden snow did not wholly remove the difficulty. Men had to be employed to dig it out yard by yard and foot by foot. This caused a large expenditure of money by the railroad companies and may, perhaps, prove an eye-opener as to the practical value of grooved rails.

"These grooves, too, it must not be forgotten, are liable to fill with mud. After all, is not the inconvenience of this contrivance greater than its convenience? The interests of the public, so largely at this time dependent upon street cars, should always be a predominating consideration.

"The devices of inventors need in these cases to be more carefully considered than they have been in the absence of practical tests. But the experience of those two evenings shows how helpless the people are if anything happens to disable the street car system. Their residences are scattered widely on the hills and through

the suburbs. Even carriages and cabs were not obtainable when it was found that the street cars were unequal to the task.

"There are many people who think that street railroads are constructed exclusively in the interest of their owners. This is no doubt primarily true, but a little experience once in a while shows that there exists a mutual interest and that the public are far more dependent upon these modern methods of conveyance than they supposed they were. River travel may be suspended from low water or ice, steam railroads may be blockaded by snow, but these are of small account compared with the blockade, suspension or interruption to street car travel. Upon the latter hundreds of thousands depend for means of travel between their places of business and their residences, and it can not be overcome very easily. It is generally worth while to profit by the lessons of experience."

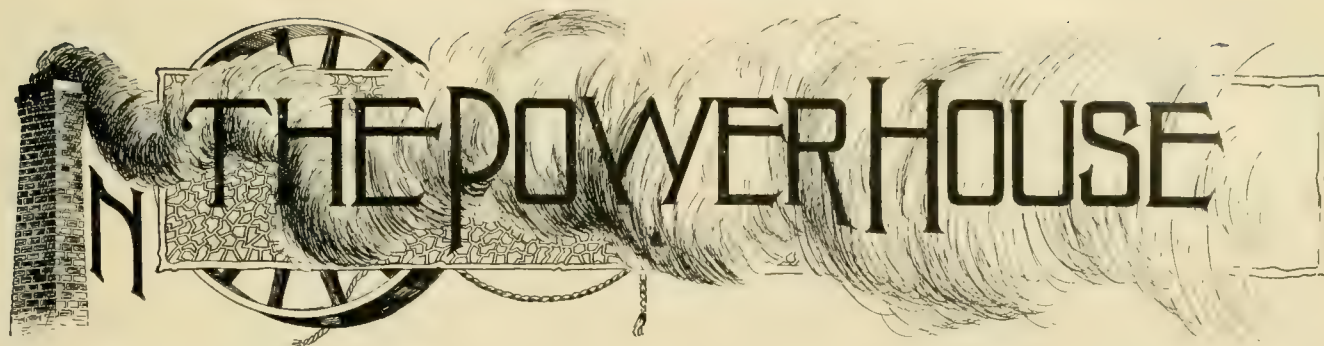
CAST-WELDED JOINTS AT ST. LOUIS.

In a report from the continuous track at St. Louis which appeared on page 58 of the January REVIEW, we noted the breakage of one of the 120-pound cast iron joints with which a mile and a half of double track was laid last fall. Since then the broken joint was taken up and examined. It was found that it contained a large blow hole near the rail ends, which, of course, was the secret of its failure. We are informed that the joint in question was run from the last iron of the last heat, and hence was of poor quality. It was thought best at the time the casting was done to run the risk of the joint breaking rather than start a new heat for two or three joints only.

RUDOLPH EICKEMEYER.

At Washington, D. C., on January 31, occurred the death of one whose inventive genius did much to advance electricity as a street railway motive power, Rudolph Eickemeyer, of Yonkers, N. Y. Born in Bavaria, sixty-three years ago, he was educated in the Polytechnic Institute, Darmstadt, and in 1850, came to the United States. Over 150 patents in different arts were taken out by Mr. Eickemeyer before he began his work in electricity. The Eickemeyer dynamo has been well known, and his winding for motors was adopted for electric railways by the Edison Company.

The St. Louis Iron & Machine Works, of St. Louis, Mo., are building a 700-horse-power 30 by 54-inch heavy duty "St. Louis corliss" engine, for the Union Depot Railroad Company, of St. Louis; one 600-horse-power 28x54-inch heavy duty engine for the Consolidated Steel & Wire Company, of Allentown, Pa.; one 350-horse-power 24 by 48-inch engine for the Bloomington Electric Light Company, of Bloomington, Ill., and one cross-compound 800-horse-power 26 by 50 and 48 engine for shipment to Kansas City.



This department is devoted to the construction and operation of electric railway power houses. Correspondence from practical men is specially invited. Both the users and makers of power house appliances, are expected to give their views and experiences on subjects within the range of the department.

The storage battery plant used as an auxiliary to the water power plant at Merrill, Wis., was started in service, January 4. It is proving a great success as a voltage regulator and reservoir for power storage, and is accomplishing what it was designed to accomplish as set forth in this department in September.

The introduction of self oiling generator bearings hindered for a time the practice of piping the oil to all bearings from an elevated tank and piping the drip to another central tank. The advantages of this plan are now causing its general introduction in the most modern plants on account of the labor saved. There is no railway plant so small but that it can be used with advantage. No investment that can be made around an engine room will pay better, as it abolishes a large amount of labor. Besides saving labor it insures a plentiful supply of oil in all bearings. Attendants will let the oil run freely when it does not cost them any more work to do so.

An engine in the power house of the Logansport, Ind., Railway has been making a good record. The following is from a letter to the Pierce & Miller Engineering Company by C. A. Herring, engineer of the plant. The plant was installed by the above company, and of course they take a little just pride in it. The engine is a McIntosh & Seymour non-condensing compound, with cylinders 13 and 19 inches by 15 inch stroke. The clipping in the REVIEW referred to was in our Power House Department in November.

"I enclose a clipping from the STREET RAILWAY REVIEW of a record of running a railway plant. Now I never did anything that I thought worth publishing, but can beat that record all to smash. I have been running one of your engines twenty-two months, 18 and 20 hours per day, and pulling in summer time three double motor cars and five single motor cars, and in winter five double motor cars with electric heaters, and I have yet the first time to stop my engine in car running time for anything inside of power plant, except twice; twenty

minutes each time, to repair circuit breaker. I never had a hot bearing of any kind in that time, nor have I run any water on the engine either, and I have to-day as nice and smooth running an engine as you can find anywhere in the country."

How to light the power station and car barns of a small road after running hours, is a question that comes up very often, and hardly ever receives a satisfactory solution. Some roads do no inspection and repair work at night in the barns, because the managements consider that it is better to lose a car's service once a week or ten days, and overhaul it during the day, rather than overhaul it by the poor light that can be obtained from signal oil torches. Between inspection days the cars are, of course, given only a superficial inspection. This is objectionable, not only because it is not possible to keep a close watch on the cars, but because it takes cars off the road when they should be in service. Besides this, the cars must be swept and cleaned in the night, whatever the arrangement, and this cannot be done well with a poor light. Engine and boiler room repairs must also be made by the dim light of the torch, which gives off enough smoke to nearly obscure what little light it does make. There are several ways out of the difficulty. Sometimes it is possible to burn gas, but gas is not a satisfactory portable light, and a good deal has to be burned to get a light where it is needed. It does not light up the inside of the cars, and that is one of the places where it is most needed. Perhaps one of the simplest expedients is to adopt the plan of large roads, and put in a small engine and dynamo to run from midnight till morning. As long as the light is needed, there will be men around to tend to the engine. Another arrangement, and one that we believe has not been tried, is to put in a small storage battery, to be charged during the day. As to first cost and cost of fuel to run a given number of lights, there would probably not be much difference between the small engine and dynamo and the storage battery. The only advantage of the battery would be that it requires no attention while discharging and furnishing light, and that it could also be used to light the station in case of a breakdown during the evening, and we all know that it is at such times that good light is wanted most. The Columbus, O., Central Railway will use Pintsch gas to light its electric cars, and consequently some of the objections which would other-

wise prevail against gas light in the barns disappear in this case. Whatever plan is adopted, it should be something better than the torch and tallow candle. It is foolishness to pay men good wages and give them such a poor light to work by that they cannot earn them.

The record of the electric plant of the Cass Avenue & Fair Grounds Railway, of St. Louis, is of interest, not only as the records of all railway plants are interesting for comparison, but because it was the first railway plant in the world to use direct connection to corliss engines throughout. We are indebted to C. N. Duffy, secretary, for the following data. Plain horizontal return flue boilers are in use. The station is operated the entire 24 hours, but as $4\frac{1}{2}$ hours of this are on an owl car load, it will be noted that calculations are made on a run of $19\frac{1}{2}$ hours.

Average daily consumption of coal	943 bushels
Average daily consumption of water, steam purposes.....	47 816 gallons
One pound of coal evaporated	6.04 pounds water
Coal consumed for each indicated horse-power exerted per hour,	
.....	4 17 pounds
Water consumed for each indicated horse-power exerted per hour,	
.....	25 16 pounds
Total stops for the year (24 hours run), 39 minutes; average per	
day.....	6 seconds
Average daily indicated horse-power exerted (19 hours 30 minutes	
run).....	927
Average number of motor cars operated daily.....	72
Average number of trail cars operated daily.....	31
Average daily car mileage, each motor car.....	123
Average daily car mileage, per trail car.....	62
Average daily indicated horse power per motor car.....	16 28
Pounds of coal consumed per motor car mile run.....	7.69
Pounds of water consumed for each motor car mile run.....	42.10

This includes the operation of the Cass Avenue, Northern Central, Union, Baden, Citizens Mail Line, Citizens Grand Avenue Extension, and Citizens Rinkerville Extension. The actual daily run in this station is 24 hours, but the average daily horse-power is obtained by dividing the total number of horse-power hours per day by $19\frac{1}{2}$. This is done merely to compare the output of the station with others which run 19 hours and 30 minutes. The horse-power is obtained from ammeter and voltmeter readings taken two to the hour every hour in the day. The results given are the average of 18,900 readings. The horse-power thus obtained is figured into indicated horse-power by assuming an efficiency of 80 per cent for the engine and dynamo. A trail car is estimated as half a motor car. Thus in calculating the total number of motor cars miles made, half the total trail car miles are added to the motor car miles, and this sum called motor car miles. An open feed water heater is used and in this way some of the exhaust steam is condensed and again enters the boilers. This explains the fact that more water is evaporated than is accounted for in the consumption which reading is the amount of city water used. The motor cars are 20 foot body cars with a double motor equipment. The car weighs about 15,000 pounds. The trail car is a 16 foot body, car weighing about 5,000 pounds. The coal used is common Illinois bituminous, rated at about 9,600 heat units. The

engines are single cylinder, non-condensing corliss engines, direct connected to 750 K. W. generators. 2,910,443 motor car miles and 717,535 trail car miles were made on the three Cass Avenue lines proper in the year 1894; estimating two trail car miles as one motor car mile; making a total motor car mileage of 3,269,210. The total cost of motive power per car mile was 2.02 cents or 1.52 cents exclusive of taxes, insurance and interest.

The Citizens Railway, a cable line owned by the same company made the following showing. This has since been changed to an electric line.

Average daily consumption of coal.....	518 bushels
Average daily consumption of water for steam purposes.....	23,765 gallons
1 Pound of coal evaporated.....	5.37 pounds water
Coal consumed for each horse power exerted per hour.....	4.70 pounds
Water consumed for each horse power exerted per hour.....	25 28 pounds
Average daily run, 19 hours 38 minutes,	
Total stops for the year, 85 minutes; average per day, 15 seconds.	
Average daily mileage of main line cable.....	186
Average daily mileage of west end cable.....	234
Total mileage of cables.....	420
Average daily horse power exerted, power house engines.....	419
Average daily horse power exerted, other engines.....	30
Friction load, (63.72 per cent).....	267
Average number of trains operated daily.....	35
Average number of cars operated daily.....	70
Average daily car mileage, each car.....	108
Average daily horse power per car less friction load.....	3.33
Average daily horse power per car with friction load.....	9 18
Coal consumed per car mile run.....	5.58 pounds
Water consumed per car mile run.....	30.00 pounds

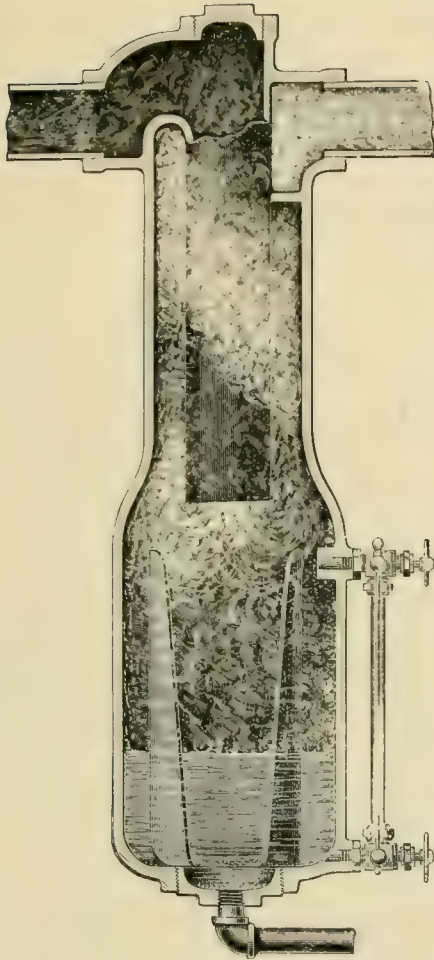
All trains operated are double, consisting of a grip car and a trailer. An open feed water heater is used and in this way some of the exhaust steam is condensed and again enters the boilers. This explains the fact that more water is evaporated than is accounted for in the water consumption, which is the amount of city water used.

Total cable car miles made on the Citizens main line and west end cables during the year 1894, 2,596,402. Cost of motive power per car mile, 2.26 cents, exclusive of taxes, insurance and interest.

The main line cable is 30,750 feet long, one 5-16-inch diameter, and runs at a speed of 9.44 miles per hour. The west end cable is 22,000 feet long, one 5-16-inch diameter and runs at a speed of 11.80 miles per hour.

Test of Stratton Separator at Cornell University.

A test of the Stratton separator was recently carried on by R. C. Carpenter, of the department of experimental engineering, at Cornell university. The results, as furnished, show, according to Professor Carpenter, that the separator removes all the water that can be taken out of steam by mechanical means. For this test the steam pipe leading to the separator was surrounded for a portion of its length with a jacket which could be filled with cold water so as to condense as much of the steam entering the separator as possible. The discharge of steam from the separator was condensed in a surface condenser and carefully weighed. The drip of the separator was



STRATTON SEPARATOR.

also carefully weighed. A throttling calorimeter was placed in the steam pipe, directly after the steam left the separator. The steam supplied to the separator contained moisture, the percentage of which varied from 5 to 21. That discharged varied from 0.95 per cent to 0.6 per cent, being practically dry steam.

BANQUET AT NEW ORLEANS.

The conversion of the Orleans Railroad and the St. Charles Street Railroad at New Orleans to electricity called together many engineers and supply men at the beginning of the new year. Some twelve of these met informally at the Cosmopolitan Hotel, and visited in a body Trisconi's restaurant, where they were served with an elaborate breakfast. Those present were: J. G. White, Baltimore; A. F. Yiles, Atlanta; Frank March, New York; J. G. Gordon, Clarksville, Tenn.; H. Scrugham, Cincinnati; W. C. Gotshall, St. Louis; M. D. Pratt, Steelton, Pa.; W. W. Kingston, Atlanta; E. B. Entwisle, Johnstown, Pa.; Nic Riviere, secretary St. Charles Street Railroad; L. M. Petitpain, secretary, and F. R. Ford, engineer Orleans Railroad.

The Lewis & Fowler Manufacturing Company, of Brooklyn, has a receiver.

GAS MOTOR CARS FOR THE UNITED STATES.

Frank H. Mason, American Consul-General at Frankfort, Germany, reports that a Luehrig gas motor car, built to meet American requirements, will be exhibited in this country in February and March.

At Dresden, Germany, since August last, four gas motors have been in constant service upon a suburban railway three miles in length. Inside and outside the appearance of the cars does not differ from that of the ordinary double-decked car. The machinery can neither be seen nor heard. No heat nor smell of gas is noticeable, it is said. Stopping and starting is effected without undue noise or jar. The engine is a two-cylinder Otto with electric ignition. The consumption of gas is moderate, the expense in Dresden, where the cost is \$1.05 per 1000 cubic feet, being 13-5 cents per car mile.

The motor which is to be exhibited in this country differs considerably from the one in use at Dresden. The engine, instead of being placed in the car body under the seat as at Dresden, is mounted on the truck, so as to be independent of the body. The fly wheel and driving machinery are laid in a horizontal position between the axles. Two sets of springs are provided; those supporting the machinery resting directly on the axles and those supporting the car body resting on the truck frame. The power of the motor has been increased from eight to 20-horse-power, and the maximum speed from nine to twelve miles an hour.

The gas supply is carried in three cylindrical tanks of iron ten inches in diameter and weighing together 550 pounds. They contain 33.5 cubic feet of gas condensed to a pressure of 120 pounds per square inch. An additional tank carries water for cooling the engine cylinders. These tanks are hung under the car body. A lever on the front platform controls the speed of the car. Another lever reverses the motion of the engine. To stop the car the engine is first disconnected from the axle and the brake applied, the engine continuing to run at full speed. On starting, the engine is thrown into gear by means of a friction clutch operated by the lever on the front platform. Pushing the lever another notch to the right turns on the full gas supply and engages a larger friction clutch, giving the maximum speed.

FIRE IN A CABLE VAULT.

A fire broke out January 25 in a sheave vault under the Broadway Cable Road in New York. At the time of the fire, one man was working in the vault, which is twenty-five feet long, eight feet wide and five feet deep. He smelled smoke and crawled out through a manhole, but not until his hair and eyebrows were singed. The origin of the fire is unknown, although it is supposed to have been caused by the spontaneous combustion of oil-saturated waste.

TEXAS STREET RAILWAY ASSOCIATION.

The second annual meeting of the Texas Street Railway Association, held at Dallas, January 23 and 24, brought representatives from most of the Texas street railway companies. The relations between employer and employed were discussed at considerable length, especially the avoidance of wage troubles, by eliminating from the mind of the employe any desire to bring on such difficulties. Reading rooms for motormen was one of the subjects brought up, and nearly every member declared himself strongly in their favor. It was urged that if any electrical journals were placed in the reading rooms they should be of the elementary class.

Fenders came in for a warm discussion. The consensus of opinion was that a well balanced hand and mind were a far better life saving combination than any mechanical device ever invented. Opinion was divided on the question of tickets or no tickets, and no definite action was taken. It was, however, pretty generally conceded that they were only a general convenience, and not entirely satisfactory either to the public or to the roads. Speed ordinances were discussed. They were found to be limited to from eight to fifteen miles per hour. None of the cities permit a speed approaching the rate allowed in the larger cities of the north and east.

The question of insurance was a fruitful topic. It was agreed that street railways ought to construct their plants so that the car barn is separate from their steam plant, so as to get a low rate on the cars and car barn. Mr. Cochran asked, "Why are we compelled to pay for insurance for twenty-four hours in each day on cars that are only exposed for five or six hours through the night." It appeared that most of the policies covered the cars while on the track or in the barn, and several suggested that the railway companies would be glad to carry the risk at the times when the cars were not in the barn.

George B. Hendricks, Ft. Worth, took the floor in favor of working up legislation to prevent the taking of contingent fees on damage suits, urging that seventy-five per cent of the damage suits brought against corporations were groundless, useless and needless expense to the counties, the state and corporations. Messrs. Hendricks, Childress, Weiss and McGregor were appointed to confer with steam roads for the purpose of asking for a law against champerty.

Revenue increasing attractions were discussed at length. Many of the members told of their experience with opera, vaudeville shows, concerts and theatrical companies. It developed that except under exceptionally favorable conditions there was no money for the street railway companies, some of them reporting losses.

The nominating committee, consisting of S. P. Cochran, Dallas Consolidated Traction Company; George P. Hendricks, Ft. Worth Street Railway Company; W. L. Sale, Dallas Consolidated Traction Company, reported the following officers, who were elected: W. H. Sinclair, Galveston City Railway Company, president; C. A. McKinney, Houston City Street Railway Company,

vice-president; C. L. Wakefield, Queen City Railway Company, Dallas, secretary. Directors: W. H. Weiss, San Antonio Street Railway Company; George B. Hendrick, North Side Street Railroad Company, Ft. Worth, and the officers. The delegates were handsomely entertained by the Dallas members. The next meeting will be March 18, 1896, at Galveston. On the night of January 23, a banquet was served, with the following menu:

"Your Fare, Please."
Grape Fruit—"Hard Drawn."
"Switch" Points. Sauterne
La "Generator."
Consomme—"Profit and Loss."
Celery—"E. M. F." Salted Almonds La "Channel Pin."
Filet de Sole—on "Fish Plates."
Cucumbers—"Short Circuit." Potatoes—"Ground Return."
Cassolette of Terrapin—with "Curve Ears."
Lamb Chops—a la "Cut Out." Claret.
"Intermediate."
French Peas—"Ampere."
Orange Ice—"On the Front Platform."
Roast Canvas-Back Duck—"Commutator End."
"Sprocket Wheel" Cakes, Ohms' Extra Dry
"Series Parallel."
Asparagus—"En Fields."
Assorted Cake—"0000 to No. 16." "Mica" Ice Cream.
Fruit—"La Currents."
Roquefort Cheese—"500 Volts."
Toasted Water Crackers—"Hard Fibre."
Coffee—"Standard Gage."
Trolley Pole Cigars—"Carbon Brush."

GETTING TOO COMMON.

The latest dodge of the personal injury claimant is to get a terrible shock from some part of the car, fall over unconscious and be carried to the hospital. After a slow recovery a damage suit is begun with the claim that severe permanent injuries have been sustained. The same thing has formerly come up in a different way, the claims being on account of shocks received on the street or at the telephone. The rather too frequent occurrence of shocks received by passengers and employes on electric cars recently, undoubtedly has suggested to the instigators of fake damage suits the possibility of an easy means of revenue. Getting a fake shock is a painless operation, and it is more difficult to prove that no injury has been sustained than if the claim was for any other form of physical damage. Fortunately, however, the nature of injuries inflicted by electric shocks is becoming better understood by physicians every day and sham injuries are being detected. A New York widow fell over with a scream in a Fifteenth street trolley car in Brooklyn the other night. At the same time there was said to be a flash. The lady was carried to the hospital in an ambulance, but the hospital physicians declared positively that she had received no shock from an electric current. She appeared well when leaving their care. The widow claims she got a shock. We have not heard of any damage suit being begun, but it looks very much like the preface to one.

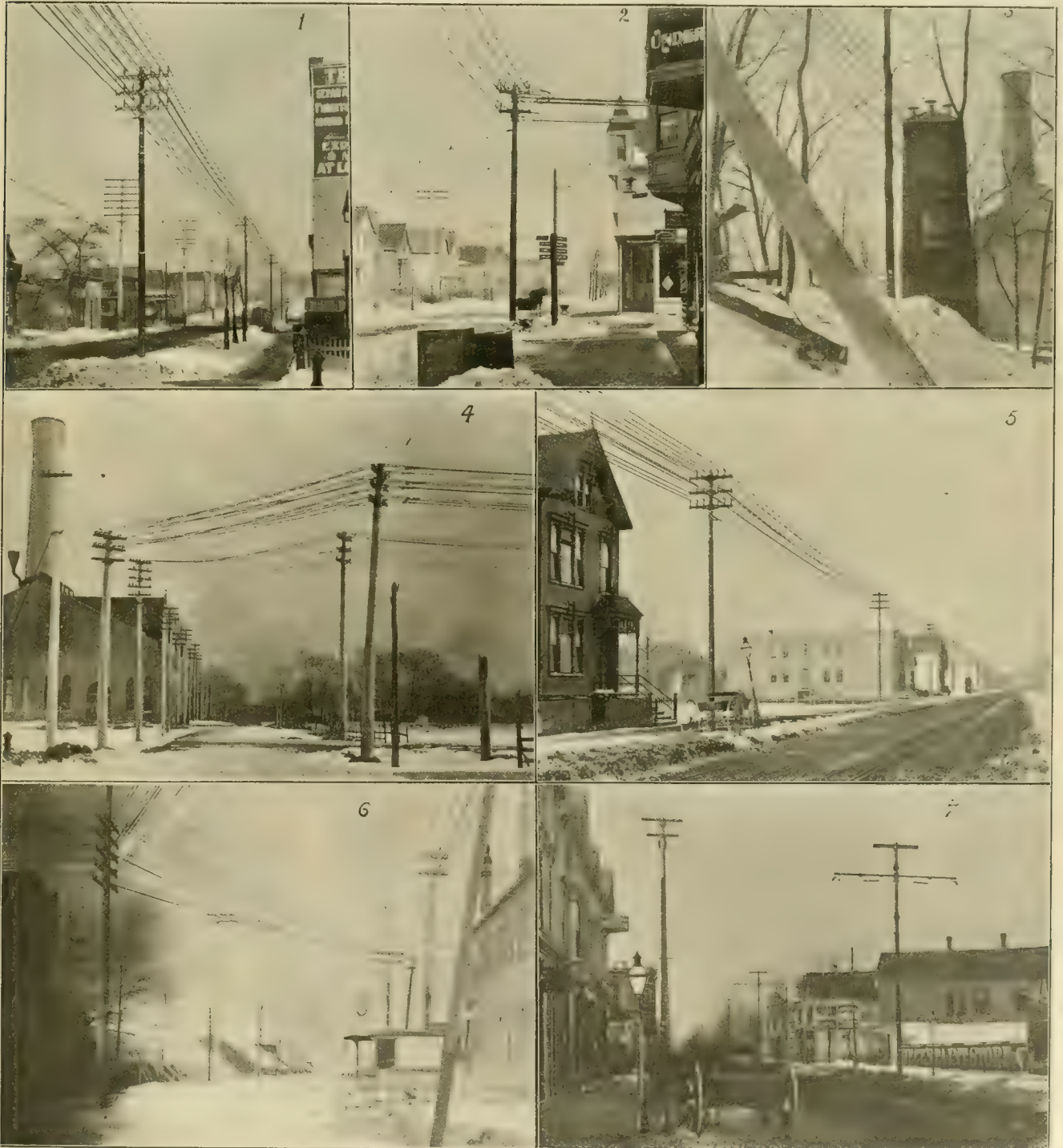
J. H. Vail, president, reports a change in name of his company from the Electrical and Mechanical Engineering & Trading Company to the Electrical and Mechanical Engineering Company.

OVERHEAD CONSTRUCTION IN CHICAGO.

"Not How Cheap, But How Good."

While Chicago has been behind the times, so far as electric railways are concerned, its slowness in admitting the trolley has given the electric railway industry time to develop, so that the experience of the many hundreds of roads already installed in various parts of the country, is available to guide those who are engaged here in the

work of construction. It has been the aim of the three companies whose work is being considered in this article to put up the best and most substantial overhead work that money can buy. So few companies construct overhead lines with this single purpose in view that a review of what is being done in Chicago will be of interest on this account, if no other. A number of special problems came up also in connection with each company's work, and the solution of these will be noted. The work here



OVERHEAD CONSTRUCTION.—NORTH SIDE, CHICAGO.

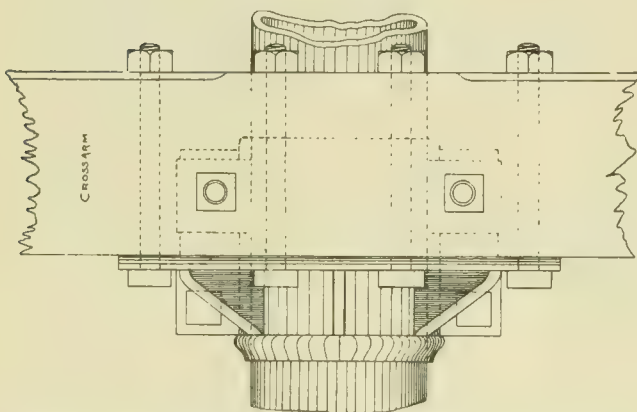
1. Specimen Feed Line.
2. A Neat Corner.
3. Tower Leading to Tunnel, California Avenue Power Station.
4. Power-House Approach. Return Feeders Running into the Ground at Right.
5. Approaching California Avenue Station from the West.
6. Clybourn Avenue Trolley and Feed Line.
7. Lincoln Avenue Center Poles.



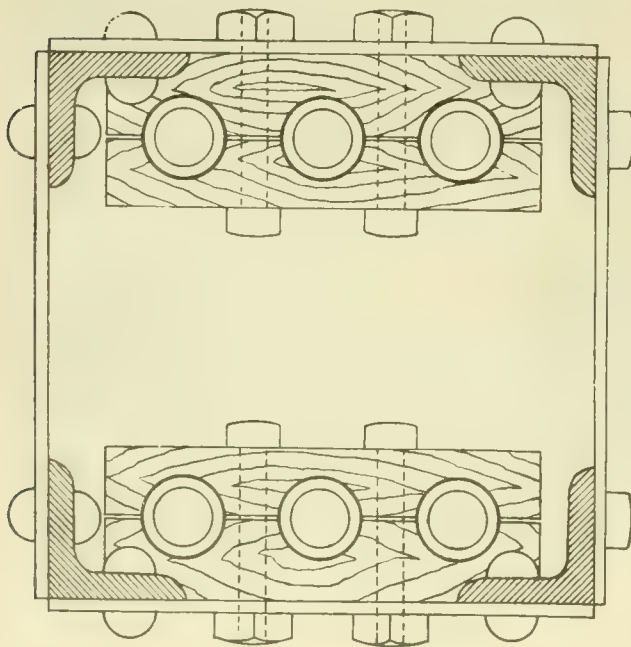
CHICAGO CITY RAILWAY STANDARD CONSTRUCTION.



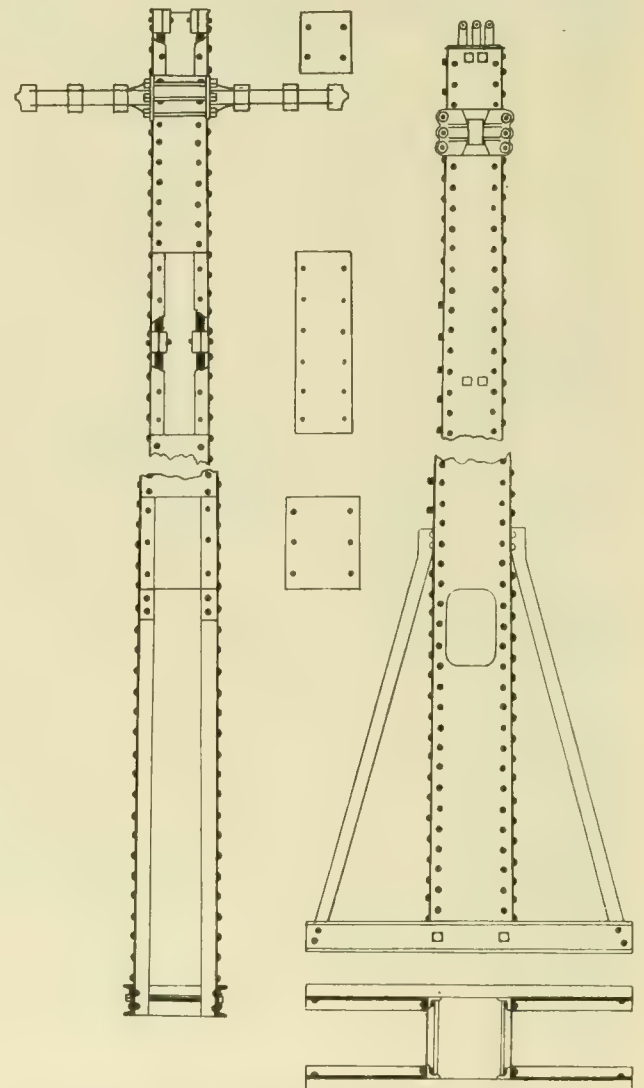
OVERHEAD ENTRANCE TO CALIFORNIA AVENUE POWER STATION.



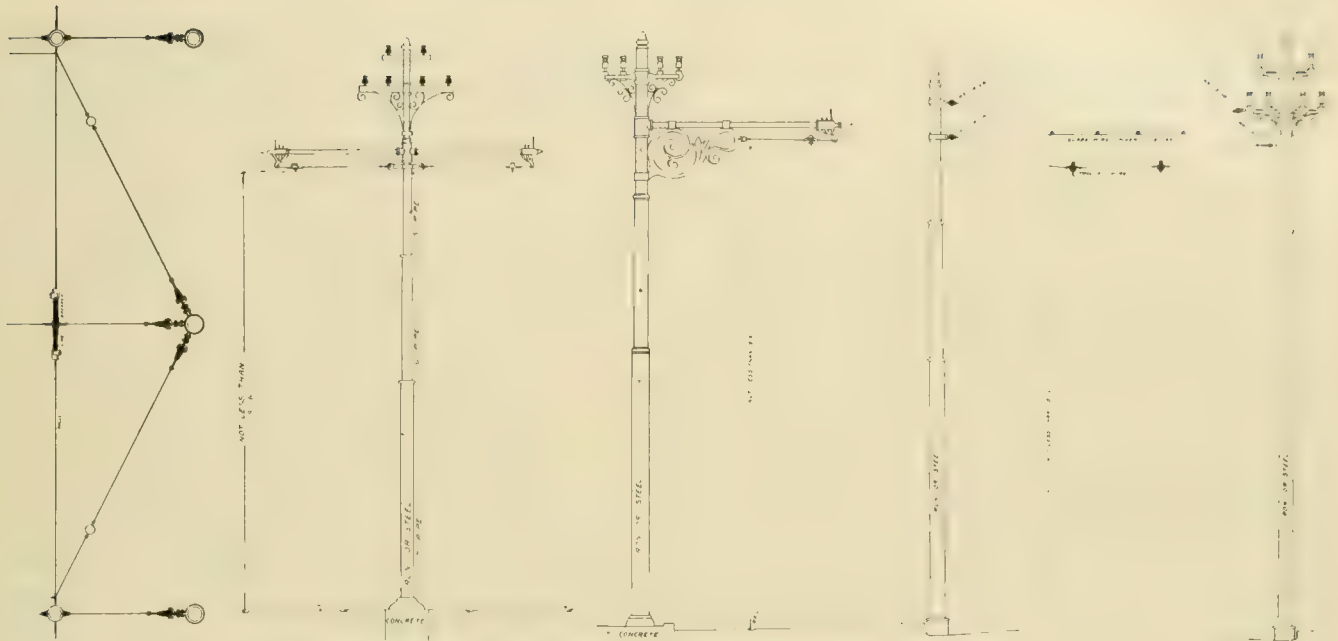
WOOD CROSS ARM FOR IRON POLE.—CHICAGO CITY RAILWAY.



SECTION OF BOX POLE FOR FEEDERS



IRON POLES LEADING FROM UNDERGROUND TO OVERHEAD FEED LINES.—WEST SIDE.

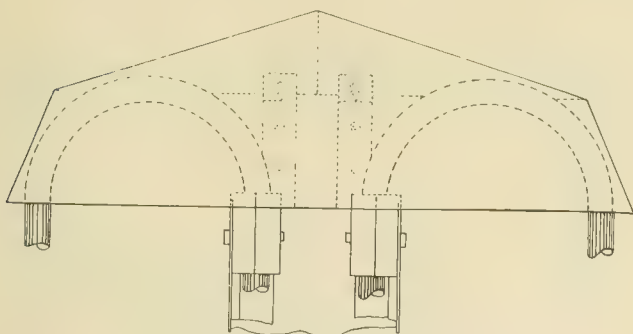


STANDARD SPAN AND BRACKET CONSTRUCTION NORTH AND WEST SIDES.

described has been carried on during the past seven months by the North Chicago Street Railroad, the West Chicago Street Railroad and the Chicago City Railway. The power houses of these companies each cover an immense territory, and consequently the feed wire construction is very heavy.

NORTH AND WEST SIDES.

The North and West Chicago Street Railroads have had J. R. Chapman in charge of the electrical work.

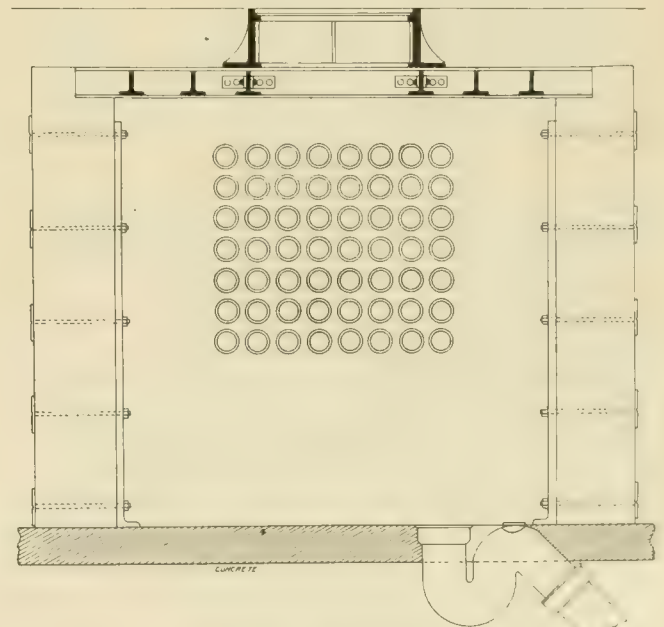


HOOD OVER BOX FEEDER POLES.

Under him is J. S. Hill supervising the overhead work on the west side and C. E. Collins on the north side. The work on the north side is now nearly completed, with the exception of that nearest the heart of the city.

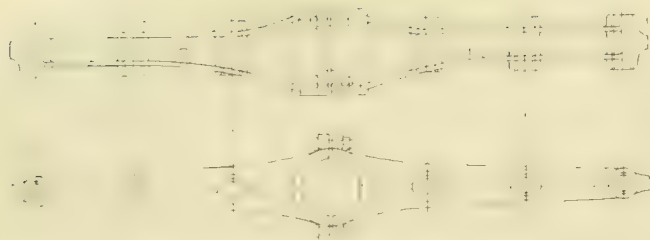
Iron pole construction is used throughout by these two companies, with the exception of a few feeder lines on unimproved streets. The standard side pole arrangement is shown in the engravings. The poles are steel tubular, 7 inches inside diameter at the bottom, 6 inches in the middle and 5 inches at the top. Andersons' strain insulators are bolted directly to the strap around the pole top. The eyebolt on this form of strain insulator allows

of a slight tightening of the span wire, although in general it is calculated that the span wires will never need tightening. The insulating material for the trolley hangers was furnished by A. & J. M. Anderson, the metallic coverings and ears were made by the street railroad company, and the trolley wire clips are from

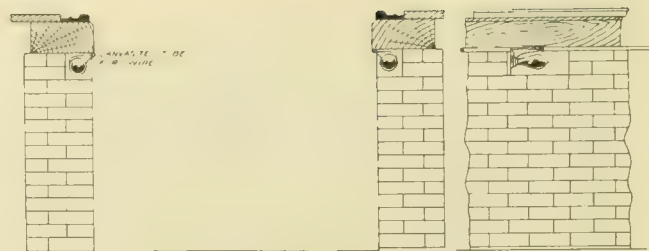


MANHOLE, WEST SIDE CONDUIT

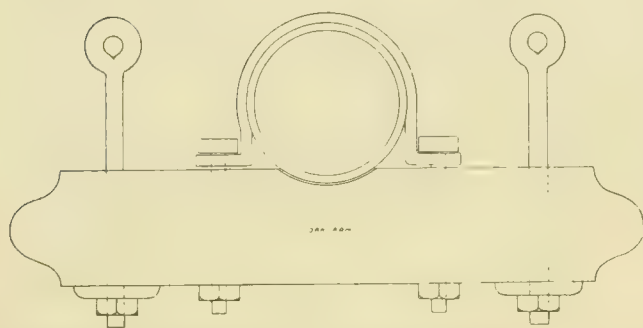
the New York Electrical Works. The poles, instead of being set in the ground direct, are put inside an iron cylinder or sleeve, which is a little larger than the base of the pole and comes up slightly above the street surface. The space between the pole and sleeve is filled by pouring in hot pitch. The idea is to prevent the poles rusting in the ground, especially near the surface. The



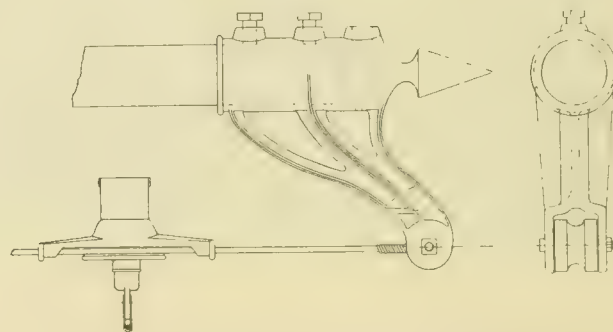
STANDARD IRON CROSS ARM, NORTH SIDE.



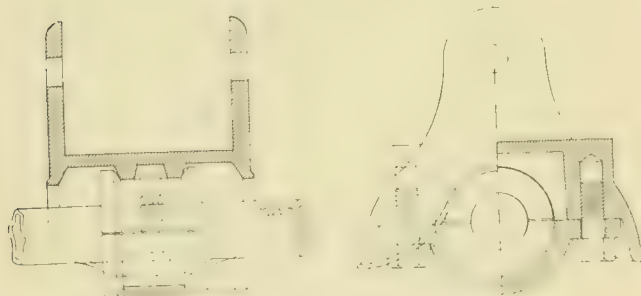
PIT LIGHTING, NORTH SIDE.



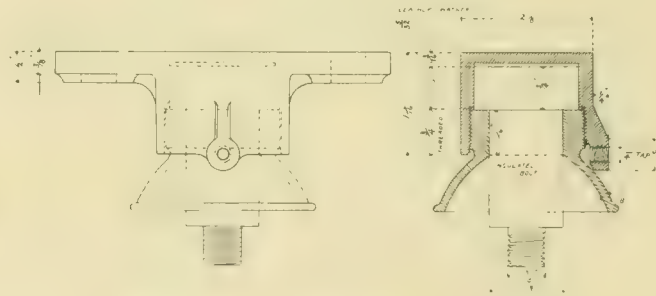
CROSS ARM FOR DOUBLE SPAN AT RAILROAD CROSSINGS, CITY RAILWAY.



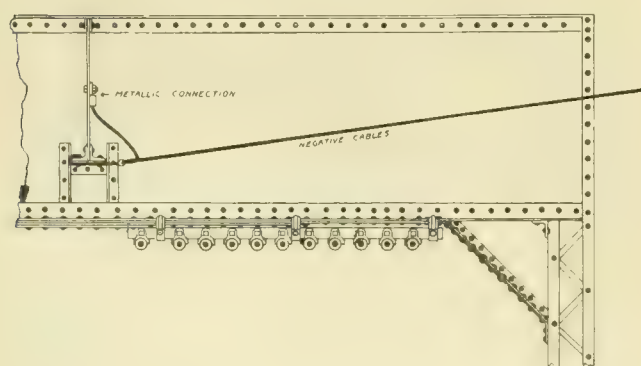
FLEXIBLE BRACKET, WITH INSULATED SPAN, NORTH SIDE.



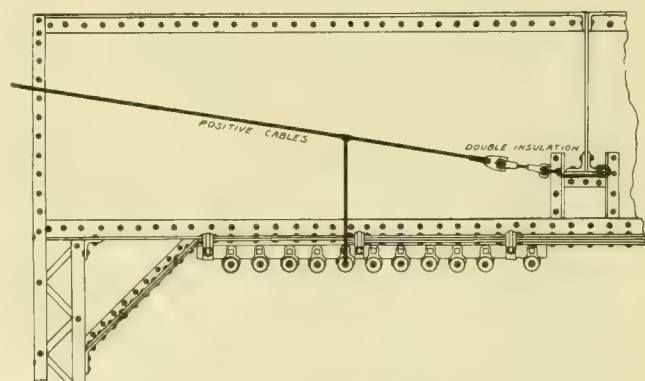
CAST IRON "DUNCE" CAP FOR FEEDER INSULATORS UNDER "L" STRUCTURE.



SPECIAL TROLLEY HANGER FOR "L" STRUCTURE.



APPROACH CONNECTION OF NEGATIVE FEEDERS TO "L" STRUCTURE.

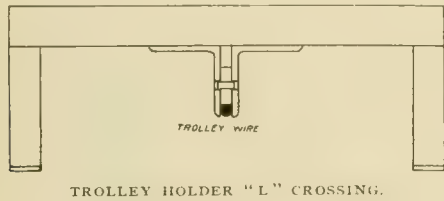


APPROACH OF POSITIVE FEEDER TO "L" FEED LINE.

sleeve is, of course, set in concrete. Trolley sections are one mile long, and feeder taps are made five times to each mile. A Westinghouse lightning arrester is placed on each section. The plan of a feeder tap pole with lightning arrester is shown among the diagrams. It will be noted that track feeders are carried on the poles alongside the trolley feeders, and that at every pole at which the trolley wire taps the feed wire a correspond-

ing tap is run down through the pole to the rails. The ground connection of the lightning arrester is made to this track tap. Guard wires are used only in places where telephone or telegraph wires are specially liable to drop. The standard center pole construction of these companies is also shown. Here, too, the principle of double insulation prevails. A short span wire is stretched between the end of the bracket and the pole. At the end of the

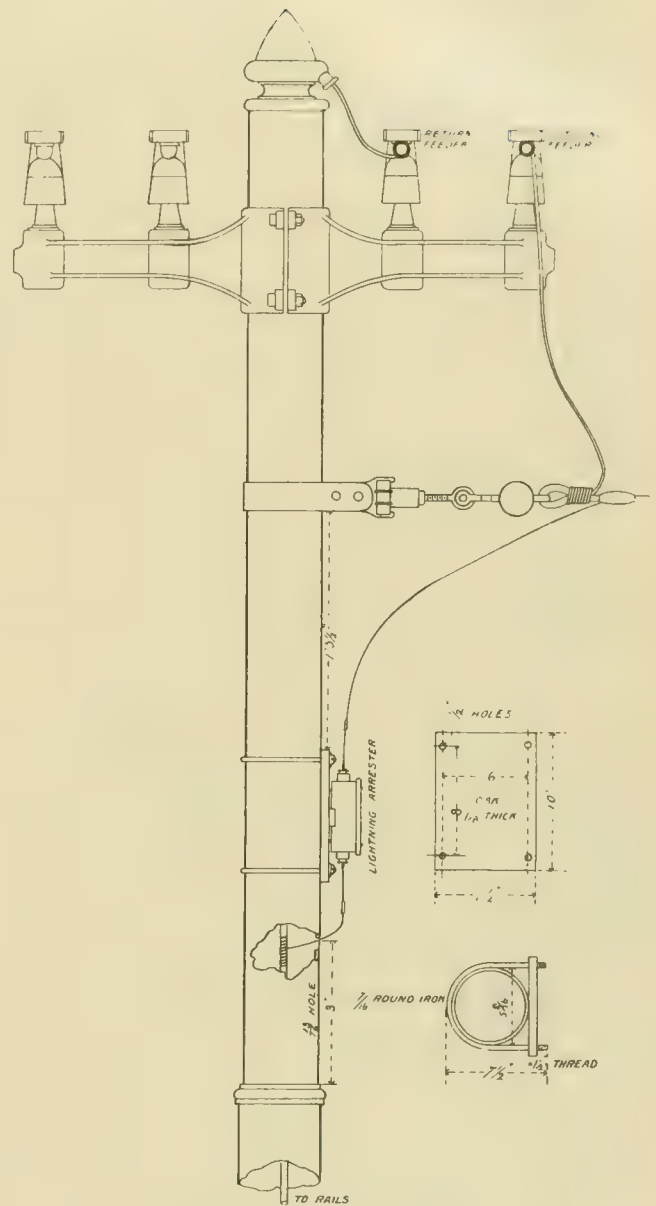
bracket it is tied around a porcelain insulator, and at the pole it is tied to the eyebolt of a strain insulator. The advantages of this arrangement are obvious to the electric railway man who knows the advantage of a flexibly suspended hanger and the trouble arising from short



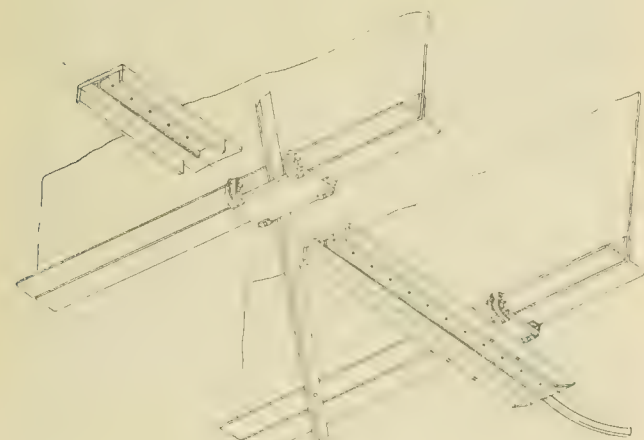
circuits when the trolley pole comes off and makes connection between an uninsulated bracket and the trolley wire. A side bracket pole is also shown for use along Twelfth street boulevard, where the boulevard occupies the center of the street and the tracks run along each side. Where a trolley line crosses under the elevated structure, a wooden trough is built and the trolley wire put between two angle irons as shown. This will make it practically impossible for a trolley pole to fly up and hit the structure.

The Lake street trolley which will run under the Lake street elevated from one end to the other will have two methods of construction. Where the structure is low, the hanger will be put in a short section of trough under each girder. Where the structure is high, a span will be stretched between the posts as in ordinary side pole work. With the first mentioned arrangement a special hanger is used.

We will now turn our attention to the feed line construction which is of interest, because of its weight and because of several special problems which have come up. The feed cables, of which the majority are 500,000 circular mil, are carried on center bearing insulators made by Andersons and consisting of a metallic top fitting over



FEEDER TAP POLE, NORTH SIDE.



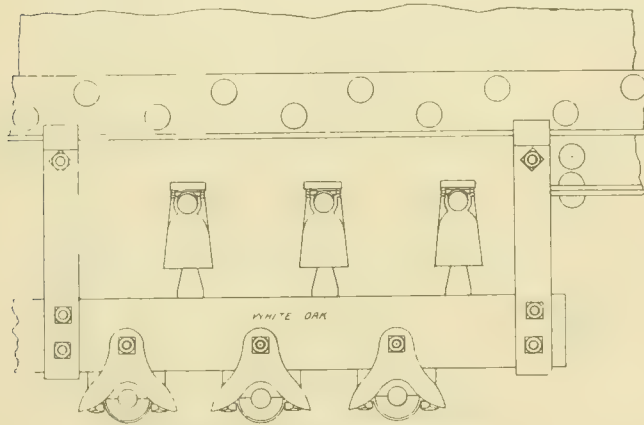
TROLLEY CROSSING UNDER "L."

a cap of "Aetna" insulating compound. They are screwed onto a pin consisting of the same insulating compound surrounding an iron bolt. The return feeders are put on galvanized iron insulators of the same shape.

These return feeders have an insulating covering. Where wooden poles are used the cross arms are all double.

Double insulation has been the policy on all work. Where feeders turn a corner they are dead ended and two strain insulators put in. At the power plant at California avenue and Roscoe street, which supplies the northwest part of the city, about half the feeders cross the river which is to be a navigable stream at this point. A tower has been erected on the east bank of the river. The feed lines enter this tower and are led through a subway passing under the river and into the basement of the power house on the west side of the river. The track feeders as they leave this power house are run in wooden troughs for a distance of about a quarter of a mile. The feed lines then diverge so that there is room for the track feeders on the poles. The track feeders when run under ground are 1,000,000 circular mil stranded and tinned bare copper cables.

The feeders from the West Chicago Street Railroad power house, at Western avenue and Washington boulevard, are taken for a distance in an underground conduit. Indeed, when it is stated that this is to be the largest railway power plant in the United States, and that it is in the middle of a thickly settled territory, it will be understood that it



LEAVING "L" AT ASHLAND AVENUE.

was not feasible to hang so much copper in the air as the output of this station would require. This conduit extends north from the power station, two blocks on Western avenue to Lake street, where the feeders come to the surface and are carried east and west on the Lake street elevated structure and north on a pole line. One of the heaviest trunk feed lines is carried under the elevated structure. The conduit extends south from the power station about a mile and a quarter, a few feeders being brought to the surface at each intersecting trolley line. Feeders are brought to the surface in iron box poles. Water is kept out of these poles by an iron hood, as shown.

The conduit was laid by the National Conduit Manufacturing Company. The ducts are $2\frac{1}{2}$ inches, inside measurement. They are of short sections of sheet iron, laid in concrete and lined with cement. Fifty-six ducts leave the power station, half going north and half south. Cables of 1,000,000 circular mils will be used in all ducts.

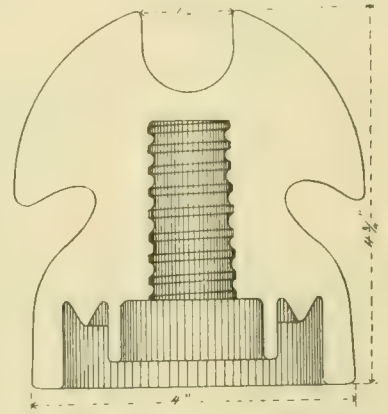
Under the elevated structure the feeders will be hung in porcelain insulators. These porcelain insulators are supported by a cast iron hood, which will keep the insulator dry. The hoods will be fastened to wood beams. The method of approaching and leaving the elevated structure with positive and negative feeders is shown, as is also the arrangement of insulators and hoods where a large number of feeders leave the elevated at Ashland avenue, and there is not room to use the common method.

SOUTH SIDE.

The Chicago City Railway electrician, G. W. Knox, has had charge of this company's overhead work, and has aimed to put up as thoroughly reliable a construction, from an electrical and mechanical standpoint, as money

and intelligence can make. He has received many compliments on the character of the work.

Side pole construction is used throughout on this road. The poles are steel tubular 7-6-5 inches, set directly in concrete. Lattice poles are used at curves. Medbury strain insulators are used in the span wires, and the trolley hangers were made by the Wallace Electric Company. The clips, overhead crossers and line breakers, of Mr. Knox's design, are made in the City Railway brass foundry. Three insulations are put between trolley



SPECIAL FEED INSULATOR.—CHICAGO CITY RAILWAY.

wire and poles. In addition to the trolley hanger and strain insulator, a wood insulator is put around the bolt where the span wire ties to the pole strap. Another special feature on this road is the arrangement of overhead curves where the curve is but seldom used, and cars pass the main line in regular service. Instead of putting in a switch which demands the conductor's attention every time it is passed, the main line is left unbroken, and the curve wire is brought along parallel with the main line for a short distance. This necessitates changing the trolley when going around the curve, but this arrangement is only put on curves that are seldom used.



WESTERN AVENUE CONDUIT UNDER CONSTRUCTION.

In feed line construction, no cables larger than 350,000 circular mils are used, as it is thought that the sag and trouble in maintaining a neat and substantial line with larger cables, more than balances the advantages of their greater size. The main pole line of this company runs through an alley between State street and Wabash avenue, so that wooden poles are used. Glass insulators, designed by Mr. Knox, specially for this work, are employed. They are shown herewith. Where feeders are carried along iron side poles, wood cross arms are used. This is a manifest advantage as to insulation, and it would take a close observer to notice the difference in appearance between it and the iron cross arm.

For a return circuit, reliance is placed entirely on heavy bonding, except near the power station, where supplementary cables of 1,500,000 circular mils area are laid in the ground between the tracks. Each rail is double bonded with No. 0000 Chicago rail bonds, except in the outlying districts, where smaller bonds are used. Wires are run around all switches and special work, to insure continuity of track circuit. At boulevard crossings, the feed wires are run underground in pump logs.

All the work described in this article was designed by men who have had years of experience in the business, and who were able to profit by the lessons taught by the electric railway construction of former days. Although it is by no means completed as yet, it is far enough along so that the general plan of construction can be studied by those interested. The work on the northwest side is nearly finished. That on the south and west sides will be completed during the next season. Work has been pushed constantly, in spite of the severe winter.

LOOK OUT FOR THESE FRAUDS.

Fraudulent accident claims pull more money out of earnings of street railway companies than they should.

The difficulty is that while the street railway companies may be conscious and are certain that a claim is a fraud, the perpetrators are so skillful, that often it is cheaper to settle for a nominal sum than to enter upon costly litigation because of the plausibleness of the claim. Through the efforts and skill of Henry A. Smith, chief adjuster, Stuart C. Wade, assistant to the chief adjusting agent of the Chi-

cago, Rock Island & Pacific Railway Company, and Eugene E. Lawson of the Bonfield Detective Agency, Chicago, a gang of frauds which have mulcted street railway and railway companies for two years, has been exposed.



JENNIE FREEMAN.

The companies that have paid damages for fraudulent claims are the Manhattan Elevated Company, New York; West End Street Railway, Boston; Chicago City Railway Company, Chicago; Illinois Central Railroad Company, Chicago. The alleged injury was the same in each case, paralysis of the lower limbs, caused by slipping on a banana peel. One claim agent wrote in reply to a letter from Mr. Wade that his company had never been caught by these people who were working what is apparently a skin game. In January 1893, Jennie Freeman, 2338 State street, a tailoress, claimed to have been injured in a collision on the Chicago City Railway. Her physician was Dr. J. Coleman Crocker, a colored man, who said she had progressive paralysis of the lower limbs. Mary Freeman, the girl's mother, made a claim against the company, which sent its examining physician, who thought the girl was shamming, although the symptoms were so cleverly simulated, that it was apparently a real case of paralysis. A collision had taken place on the day alleged, and although the claim agent, Mason B. Starring, was confident the company would win its case, he decided to allow a nominal sum, believing it to be cheaper to settle.

In September 1894, Jennie Freeman walked into Mr. Starring's office, with another claim against the company. Her mother, Mary Freeman, 37 years old, weighing 200 pounds, living at 6005 Wentworth avenue, had fallen in a Wentworth avenue car. She was totally paralyzed below the waist. Mr. Starring listened to the story. When she had finished he asked Jennie, if she wasn't the young woman, who was paralyzed a year before, and with whom the company had settled. She replied that she was. Mr. Starring congratulated her on her recovery and she replied that she was so happy now that she was well. He then said to her that her family was having altogether too many accidents and too much paralysis, but he would investigate the case. The old woman was not so skillful as her daughter, but as they had a host of witnesses, a settlement was made for a nominal sum. Dr. Wilder, Sixty-third street and Wentworth avenue, was the physician attending.

On October 5, 1893, Jennie was in a Second avenue elevated train of the Manhattan Elevated, New York. While going around the curve at Twenty-third street, she was thrown against a seat. She reached her home at 221 East One Hundred and Twentieth street with some difficulty, and the accident had resulted in total paralysis of the lower limbs. The company settled for a nominal sum, and paid her physician, Dr. H. M. Block, 155 East One Hundred and Seventeenth street, \$100 for his services.

Jennie apparently had finally been cured of paralysis, but it was still epidemic in the family, which moved to Boston. On April 20, 1894, Fannie Freeman, 75 Dover street, slipped on a banana peel in an Essex street car of the West End Street Railway Company, Boston. Her lower limbs were paralyzed, and the company settled for less than the cost of litigation. Dr. W. G. Burke, 1308 Washington street attended her. On June 6 1894, Elsie

Beldon, 75 Dover street, slipped on a banana peel in a car on the New York, New Haven & Hartford Railroad, and was paralyzed in the lower limbs. Dr. Tobey, 361 Columbus avenue was her physician. Six days later Dr. R. P. Hubbard made an examination, discovering the same girl, the same mother, the same room and the same symptoms, which he had noticed, when he examined Fannie Freeman on behalf of the West End Street Railway Company. The frauds were unmasked and received nothing from the company.

On May 16, 1894, Jennie slipped on a banana peel in train 101 of the Boston & Maine Railroad, and received \$125 from the company.

The family came back to Chicago at once, where Jennie had another paralytic stroke on the 28th of June, 1894. She was on an Illinois Central train and slipped on a banana peel, being thrown against a seat. She lived at 5804 State street and was attended by Dr. J. P. Smyth, 5500 State street. Dr. J. E. Owens, surgeon of



ESTHER.

FANNIE.

the company, made an examination and a settlement was made.

Now comes the interesting part of the story, which shows how the frauds were exposed. On December 19, 1894, Fannie Freeman claims to have slipped on a banana peel in a car on the Chicago, Rock Island & Pacific Railroad suburban train. She was totally paralyzed below the waist as a result of the injury. She was accompanied by her mother, Mary Freeman, and sister, Jennie Freeman. The mother said they had bought single trip tickets, and that she and her other daughter had saved themselves from falling by catching hold of the straps. She had made no complaint before the 24th, as it was not thought the accident was serious. She did, however, have the car number. As there are no straps in Rock Island cars, and the woman offered to settle for \$2,000, Mr. Wade knew the case to be a fraud. He put detectives on the case, who unearthed an interesting story.

The Freemans, consisting of the mother, three grown daughters and a child, lived at 668 West Twelfth street. There was also a father, Philip, who was never around,

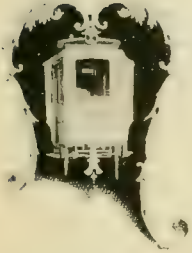
and a boy Ikey, who wrote from New York that he had slipped on a banana peel in a Broadway car of the Metropolitan Traction Company, and was paralyzed as the result of the accident. He wanted \$15 for expenses, which he would return when his claim pending against the company was settled. The detectives rented the flat above the Freemans and two of them went in as boarders. Detective Lawson was introduced to Jennie as Mr. Seymour and admitted into the Freeman flat, becoming recognized as her lover. He found where Fannie, the paralyzed girl, was located, and that night an odor, as if from a dead rat, was noticed in the flat above. The floor was removed, and one of the boarders in attempting to get across the opening accidentally stepped on the plaster and punched a hole in the ceiling of Fannie's room. Profuse apologies were made, but the owner of the building never got around to fix the plastering.

The carpet was replaced in the floor above and a rug placed over it. Observations were made by the detectives who crawled under the rug, lifted a piece of carpet, and peeped through the hole. Many strange and disgusting sights were seen. When no strangers were about, Fannie was gay and lively, jumping over chairs, dancing, kicking and walking. When the examining physicians were expected, the girl was put in a tub of ice water, her limbs bathed, and her face washed until the temperature of her body was reduced. Then she walked to bed and was ready for inspection. Her symptoms were such as are usually indicated in cases of paralysis, but one day she fooled herself. The doctor took hold of her foot and raised it, suddenly releasing it. Instead of dropping, as the books said it should, it remained up. All this time the mother and sister Jennie were making signs to her to drop it. Finally the doctor placed it back on the bed and struck his lance into it, but she never winced. After the doctor had gone, the mother and sister jerked the girl out of bed and pummeled her, giving her a lecture on paralysis and ossification. When the arrest was made, the men at the peep hole were discovered to be prisoners, who made a confession in the police station, from which they were released on their own recognizances, but did not appear and have disappeared.

The Freemans are English Jews of a low type. Jennie is the brains of the family. She is a striking girl, as will be seen by her photograph. The disease which they use in their raids on corporations is one that baffles physicians, for it is of a nature that only time will tell whether permanent or temporary disability exists. In the cases of the Freemans, there are many of the symptoms which are simulated so perfectly that reasonable doubt existed in the minds of eminent physicians and specialists who have examined them. The only way to be absolutely certain whether a case is legitimate or not is to put in a nurse who can keep informed by constant watching that there is no shamming. The girls shown in the other illustration are sisters. Fannie, on the right, aged 20, is the paralyzed lady; the other is Esther, aged 17.

THE MIDDLETOWN-GOSHEN TRACTION COMPANY.

What an Interurban can do for a Community.



MIDDLETOWN, N. Y., is like some larger communities, in at least one respect. When the Middletown-Goshen Traction Company first made overtures for a railway franchise through the streets of the city, every one of the "hold backs" in the place began a hue and cry against its admission. "Beautiful streets will be destroyed." "Our

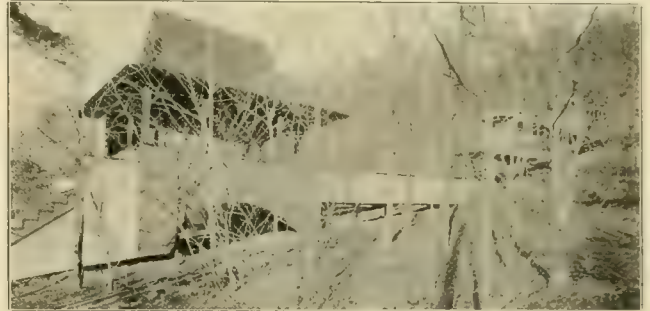
horses will never become used to them." "Our children will all be killed," etc. The newspapers published long "Letters from the People," in which the matter was discussed pro and con, and finally after six months delay, the franchise was granted and the road was completed May 7, 1894.

The population of the city is about 14,000, but since the opening of the road over half a million have ridden on the cars. Surely this is a record in support of the company's claim that the road was needed and would be appreciated.

Middletown has no place of amusement. It was the custom of a large portion of the population to take a walk each Sunday in the cemetery, or on the elevated streets in quest of nature's beauties. Now the Middle-

town-Goshen Traction Company has added new blessings to the people by establishing a public breathing place and a public resting place, reached easily and at the cost of a popular nickel.

Midway Park was discovered. Strange as it may seem no one who had lived in the vicinity for generations ever thought of "Hopper Hill," as a park. There



BOTTOM INCLINE.

was a grand view from the top, but it was marshy below, and the Wallkill river at its base made it hard to reach from the city. But there came to the rescue, the artistic eye and the pluck of the company. The spot was purchased and named Midway Park, being midway between Middletown and Goshen. Then the old croakers looked up and shouted "bluff;" for it would cost a deal of money to build to Midway, and a large amount to transform the woods and marsh into an attractive pleasure resort. Only a few short months have passed, and Mid-





W. B. ROCKWELL.

JAMES HINCHCLIFFE.

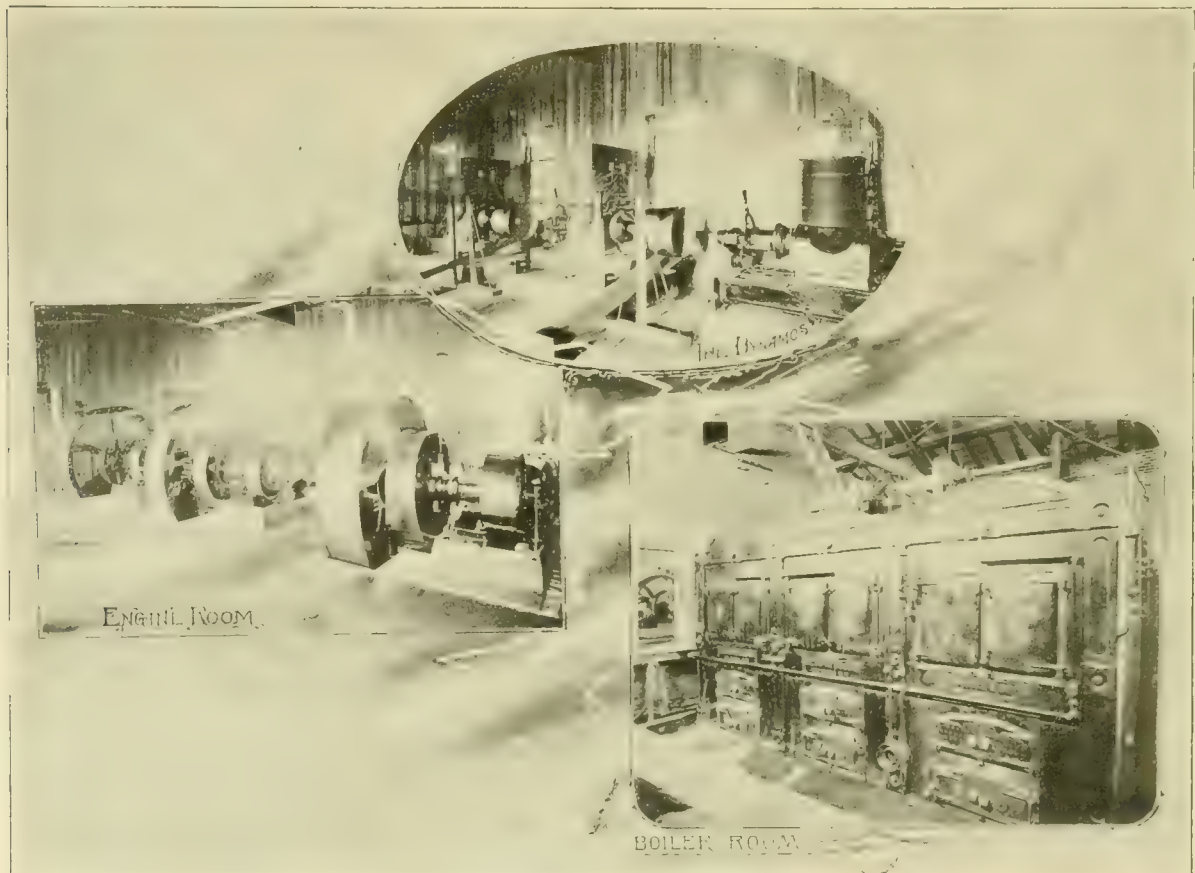
E. G. WIGHTMAN.

M. J. WIGHTMAN.

way Park is a success. The rails follow the public highway for a distance of a mile, and then turn abruptly into a glen of great charm. The overhanging branches of maples, elms and buttonwood form in summer a canopy of leaves through which the humid rays of the sun can not penetrate. By the side of the tracks ripples a brook, in summer, while in winter it becomes a raging torrent, threatening to wash out the road bed in its onward rush to the river Wallkill. Fully a mile and a half of these charming surroundings exist, when one suddenly rounds a curve and before him is the elevated section of Midway Park. From amid the lofty pines stands above the highest, the pretty observatory. Below it and winding about the hill is the roller coaster.

People are carried up to the observatory on an incline

railway, rising 150 feet. This incline is operated with a cable run by an electric motor. The cars are street cars on trucks elevated at one end. The fare up the incline is five cents. From the observatory at the top of the incline a roller coaster winds around the hill for three quarters of a mile. The fare on this also is five cents. The electric road passes through the very center of Midway Park's pleasures. Here the first object to greet the eye is the dancing pavilion. It is built pagoda style and a peristyle connects it with the restaurant. The band stand, the merry-go-round, razzle dazzle, shooting gallery, bowling alleys, billiard rooms, photograph gallery, the goat carriages, lunch building, and the clam bake grounds are all near at hand. An electric launch glides up and down the placid stream and innumerable row





WINDS AROUND THE HILL THREE-QUARTERS OF A MILE,

boats are moored at the landings. On top of the hill is a reservoir which is kept full of artesian well water by an electric pump. This is piped to all parts of the grounds. Now, in the winter months, a toboggan slide is being constructed and the Wallkill is lined with arc lights on either side, making it a paradise for skaters.

Thanksgiving Day the wealthy village of Goshen, the county seat, $6\frac{1}{2}$ miles from Middletown, was connected with the Park, and thus with Middletown. Cars run between these two places in thirty minutes. By results not only the people of Middletown and Goshen have learned a lesson of enterprise and energy, but surrounding counties look on in wonder. Places within a radius of twenty miles have asked to be connected, and it seems not unlikely that in a few years, Orange and Sullivan Counties, New York state, and Sussex County, New Jersey, will be thoroughly gridironed.

The cash fare from Middletown to Goshen is ten cents. Twenty-five tickets are sold for \$2.00. The fare to the park from either end is five cents.

The casual reader, even may see at a glance what a boon to Middletown and Goshen this road is. Middletown has one of the largest milk condenseries in the United States. It receives its supplies from farmers surrounding. To the farmers, the railroad comes as a rain in the time of drought, to help them out, at a time when low prices and over production make the farmer a laborer who gets not the worth of his hire. Now milk is delivered in a regular milk car to the condenser or any of the three railroads which pass through this city. Feed is delivered almost to the barn, by the car load. He gets cheaper coal, for by means of the trolley line he may buy either of the Erie, or Ontario & Western Railways. In storms he leaves his animals within their shelter. By this change in the manner of country transportation heavy loads are not so frequent upon muddy roads, and consequently highways are better. Business

men have done away with engines and boilers and the electric power sets in motion machinery at a moment's notice, when before the delays in getting up steam were costly and annoying. Farmers can have power delivered to their pumps and threshing machines, and candles will be relegated to the grease pan, electric lights being used in farm house and barn at little cost.

Not to be passed by is the effect upon the social world of the city. It is quite the fad to secure a private car to the Midway restaurant, and teas are given there by the leading social lights. Private parties visit between this city and Goshen, and only recently a wedding party came from a farm house a mile out of town, to the train, aboard a private car.

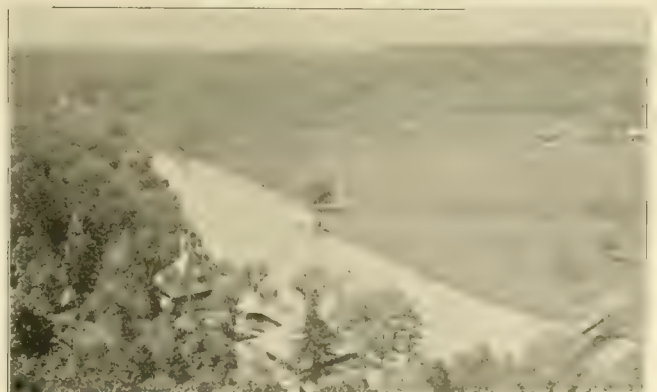
Middletown is situated sixty-seven miles from New York. It has the advantages of the New York, Lake Erie & Western, the Ontario & Western, and the Susquehanna & Western Railways. It has manufactories of all kinds, tanneries, hat shops, silk mills, file shops, saw shops, and the Ontario & Western shops. These are extending their plants steadily, and new employes are taken on, the population showing a 40 per cent increase in the past ten years. These men are now building suburban homes along the line of the trolley, and life seems more worth living.

The road is bonded for \$13,500 a mile. A half mile of girder was laid but the city allowed the exclusive use of T rail, after seeing girder and T compared. The T rail is paved to with special molded brick. The rail is 66-pound, made by the Lackawanna Iron & Steel Company, of Scranton, Pa.

The work of building was done by the Rockwell Construction Company. Ten miles more will be built to Bloomingburg in the spring.

For hauling baggage and milk, a long, double truck car is used, which is equipped with four 25-horse-power motors. This gives it power enough so that it is used as a snow plow, and no special plow or sweeper has to be maintained.

There are in all eighteen cars, built by the St. Louis Car Company, and mounted on same company's trucks, of which eleven are closed and vestibuled. They are heated with Consolidated electric heaters, and have New



SECTION OF PARADISE.

Haven registers. The generators and motors are General Electric.

The power house is equipped with three 150-horse-power boilers and three 125-horse-power engines, made by B. W. Payne & Sons, of Elmira, New York. These are doing splendid work, and the management feels that it has made no mistake in selecting them.

The engines are high speed corliss, running at 160 revolutions a minute. They have the centrifugal shaft governor of the high speed engine. This controls the cut-off valves directly while the exhaust valves are operated by a fixed eccentric. This arrangement does away with the dash pots releasing gear, and governor belt of the corliss, allowing a high rotative speed and consequent close regulation while the economy due to corliss valve gear is maintained. The regulation of speed is under 2 per cent. Some engines of this kind run as high as 225 revolutions per minute. In this plant the engines have 5-foot fly wheels weighing five tons each. The boilers are horizontal tubular, with the shells double butt strapped and triple riveted.

For an interurban company this corporation had an unusually hard fight to secure franchises. The prejudice was very much more than the ordinary, for such small cities. The strongest kickers are now the regular patrons. The officers have won the respect of their enemies and strengthened friendships, by their thorough business-like methods. The affairs are carried on by James C. Hinchliffe, president; M. J. Wightman, vice-president and electrical engineer; W. B. Rockwell, treasurer; and E. G. Wightman, secretary.



THE TEA POT FARE BOX.

Another man has made the great discovery and is trying to introduce in Ohio, as something new, that old worn out idea of a portable bank suspended from the conductor's neck, into which, with their own hands, the passengers must deposit their exact fare. The scheme has no advantages and many disadvantages, and is one of the historical events of early days in Montreal. It was attempted in one or two cities in the States, but at New Orleans was the issue of a threatened strike, which nothing but a prompt consignment of the ridiculous "tea pots" to the scrap heap, prevented. It is little short of an insult to send a conductor out on a car tied to a toy bank. Conscientious conductors recognize in the fare registers an indispensable assistance in keeping account of trip collections and totals, but to make of a man a traveling automaton is simply ridiculous.

When the sun isn't shining we have the electric lights; and when weary of life we can take a ride on a trolley car, says the Atlanta Constitution.

WENSTROM CASE DECIDED.

The creditors' suit against the stockholders of the Wenstrom Consolidated Dynamo & Motor Company, Baltimore, in which the receiver asked an order of court requiring the stockholders to pay an assessment on all stock not fully paid, has been decided in favor of the plaintiff. The court rules the 5,000 shares returned to the treasury was a fraudulent evasion of the law, and such stockholders as had not paid in full must now pay their proportion of such difference between amount paid in and par value of stock, as it is necessary to discharge the allowed claims. The court does not hold the directors guilty of moral fraud, but simply an attempted evasion of liability to creditors imposed on this stock by law.

ELECTRIC CARS IN FAIRMOUNT PARK.

Several petitions have been presented to the Philadelphia Park Commission, against and in favor of the building of trolley lines in Fairmount Park. One of the latter was from workingmen, as follows: "We, the undersigned, representing 20,000 workingmen and women of Philadelphia, respectfully petition you to allow the trolley system to be used in Fairmount Park. As the park is the property of the people, in spite of the protests sent you by six old maids belonging to a club, and as such railways are desired by the poor people, so that they may enjoy the picturesque scenery of the grandest park in the world, the undersigned respectfully pray you to allow them to have such facilities that cheaply they may be enabled to traverse its utmost boundaries and enhancing beauties. And its grand natural highways leading to Lemon Hill, Strawberry Ridge and the Devil's Den cannot be traversed by the palatial steamboats, except canals be dug, and as we cannot afford coaches and spans, like the amiable creation of a bygone age, we beg you to allow us 5-cent trolleys, so that no longer it will be true of Fairmount Park—

"The rich they ride in chaises;
The poor they walk—good gracious!"

KNEW HER BUSINESS.

In the midst of a rush at the Broadway station of the Kings County Elevated, a young woman was pushing her way to a smoking car one evening during the strike, when the conductor apprised her of her mistake. "Never mind," she answered, "I know my business." Then she took a seat in the smoking car, and, opening a package of cigarettes, began smoking, much to the surprise of the men.

"What did you put up the fare on your street cars for?" asked a young man of Tom L. Johnson at a political meeting in Cleveland. "To make money, young man; what do you suppose?" was the statesman's frank reply.



Berlin to Kagan, Germany, is the route of a proposed electric line.

Prague, Bohemia, is to have an electric street railway extending to Zizkow.

The Calcutta, India, Tramway Company has adopted a grooved girder rail in place of the tram rail now in use.

An overhead trolley line will be built at Cointe, a suburb of Liege, Belgium, by Messrs. Dulait, of Charleroi.

The Melbourne, Australia, Tramway & Omnibus Company has declared a dividend of 5 per cent for the current half year.

Permission to construct a street railway between Tezpur Town and Balipara, Assam, India, has been granted to the Balipara Tramway Company, Limited.

At Nice, France, an electric railway will be built by Albert Senechal and others. It will extend to Cimiez, a distance of three miles. The contractors are Georges Averley and Jules Weitz, of Lyons.

English capitalists seem still to be skeptical about the financial success of the trolley system, in spite of the fact that there is abundant proof, both in Europe and America, that it is the most economical, as well as the most conducive to traffic, of any system extant.

The horse car lines at Bilbao-Sansurce, Spain, nineteen miles in length, will be equipped for electricity by the Allgemeine Elektricitats-Gesellschaft, of Berlin. Eight freight and twenty-eight passenger cars will be operated. Seventeen of the cars will have two motors of twenty-five aggregate horse-power.

It is stated on good authority that 1,100 electric motor cars are in operation on the European continent operating over 400 miles of track. Contracts are being carried out for 350 miles more of track and 500 more motor cars. The economy of electric over horse traction is about the same as in America.

Gas engines seem to be making much more progress in Europe than in this country. B. H. Thwaite, an English civil engineer, has devised a form of gas plant, for generating gas for gas engines, that does not require anthracite coal or coke, but will use ordinary soft coal. The plant required is not complicated, and is certainly a step in the right direction.

Thousands of horses have been shipped into Scotland, during the past six months, from American cities, where electric traction is being adopted. These importations have had a depressing effect on the price of horseflesh in England. Breeders in that country are anxiously asking themselves what will be the result of the conversion of horse lines to electric in their own cities.

At Toulon, France, the horse lines will be converted to the trolley system. Each of the thirty cars will be equipped with two fifteen horse power motors. E. Faye will build three electric lines at Le Mans, France. Mr. Faye has just finished an electric road at Dijon; and another has been placed in operation at Lille. The Bordeaux electric railway is to be extended.

The North Metropolitan Tramways Company, London, made a net profit of \$274,570 during the half year ending December 31, 1894, the gross receipts being \$1,176,570, and the total expenditures, \$902,000. The number of passengers was 46,634,692; car miles, 4,467,154, against 41,018,844 passengers and 4,088,302 car miles for the corresponding period of the preceding year.

A section of street railway in London will be offered for lease to the highest bidder by the London County Council. This section is the first to become the property of the city by the municipal ownership act. The lease will revert to the city three years hence, when it is expected the city will itself operate the line, a bill having been drafted to permit operation as well as ownership by the city.

A German storage battery tramway has been placed in operation at Hagen, Westphalia. Cars carry 26 passengers. Two wooden troughs contain 44 copper-zinc cells each. A suspended railway on the Langen system is to be built at Hamburg. Permission has been given to construct an electric railway from Stralau, under the Elbe by tunnel, to Treptow Park. The Dresden Street Railway Company has been authorized to adopt electricity.

The City & South London Railway, which it will be remembered is the only underground electric rapid transit system in the world, seems at last to be earning enough to pay a very small dividend. Several serious mistakes were made in the design of the road, the most important one being the shortness of the station platforms. These will only admit of the use of three car trains when drawn by a locomotive. As the headway between trains cannot be very short with high speeds the carrying capacity of the road is not very great during the rush hours. It will be very difficult to enlarge these platforms. Experiments are being made with four car trains having a motor car in place of the locomotive. This of course gives a slightly greater capacity. Extensions are being made which are expected to increase the dividends.

What would be in America a most unusual proceeding was made by the South Staffordshire, England, Electric Tramways recently. The service was discontinued pending a financial arrangement between the Tramways Company and the Electric Construction Company which furnished the electric equipment. The Electric Construction Company has taken possession of the cars and plant. Notice was posted several days in advance that the service would be discontinued. It seems most remarkable that Englishmen, of all people, should allow their transportation facilities to be interfered with in this way. If every American street railway should suspend operations when embarrassed financially, what an uprising there would be. The difficulty does not seem to be on account of the expense of electric traction, as the electric portion of the South Staffordshire system operates more economically than any of the other divisions.

The English mind seems to be incapable of grasping the fact that the substitution of electric traction for horses means a radical change in surroundings and conditions, and that it must be regarded as something more than a mere change in the manner of hauling the cars over the track. The Electrician of London says: "Whilst 'riding in a car' is, it would seem, the height of enjoyment across the Atlantic, it is with us deemed by many a somewhat painful process to be borne indeed with cheerful resignation, but not to be deliberately sought after any more than any other of the trials of life. Fashionable, as well as industrial suburbs, are, it appears, developed in America by a happy combination of 'real estate men' and street railway promoters." Horse car travel may indeed be at times a painful process, but that electric car travel is as different from it as night is from day does not seem to occur to our worthy cousins across the water. The electric road creates travel wherever it goes.

Traffic over the Berlin Metropolitan elevated railways is steadily increasing, without, however, diminishing receipts on the surface street railways. To accommodate the traffic the belt lines will be laid with four tracks throughout. In 1887, after the elevated Stadtbahn was well in operation, the number of trains daily was 306, and 340 on Sundays and holidays. In 1892 the number was 434 on secular days and 484 on Sundays and holidays. The number of passengers in 1892-93 was 57,000,000, of which 80 per cent were metropolitan, 15 per cent suburban and 5 per cent main line passengers. Fares on the metropolitan lines are fixed on the zone system. The point where the passenger gets in is marked on his ticket with nippers by the ticket examiner at the gate. For a distance of less than six stations, the fare is 3.6 cents second class, and 2.4 cents third class. For distances of five or more stations, the fare is 7.2 cents second class, and 4.8 cents third class. Workmen's weekly tickets, good for one trip each way six days in the week, are sold for 21.6 cents. The Stadtbahn, which is owned by the state, cost \$20,000,000, but the net surplus between receipts and expenses was only \$300,000.

TESTING EYESIGHT AT ST. LOUIS.

The motormen and conductors of the Lindell Railway, of St. Louis, are now obliged to undergo an examination as to sight and hearing. When this practice was begun, some startling facts were developed with regard to the

189

*M.**Sent for Sight and Hearing examination by**Sup'l.**Employe.*

eyesight of some of the old employes. One could not distinguish a man forty feet away, and several others were more or less defective in sight. When an applicant is sent to the doctor to be examined, the superintendent, G. W. Baumhoff, fills out blanks which are

LINDELL RAILWAY CO.

No. .

EXAMINATION OF SIGHT AND HEARING.

489

M.

SIGHT			HEARING.		
EYES	ACUITY	FIELD	EARS	VOICE	WATCH
RIGHT			RIGHT		
LEFT			LEFT		

*Applicant has**passed the required examination*

MEDICAL EXAMINER

*M D**Why not passed*

printed on the back of the medical examiner's business cards. The back of one of these cards is reproduced here, together with the blank used by the medical examiner in making his report to the superintendent.

Three farmers were discussing the cheapness of horses. One attributed it to the use of electric in place of horse cars. The second laid it to the bicycle. The third, a German, feelingly remarked: "I vill dell you vy horses are so sheap; it's because in Vashington dere's so many tam shackasses."

Cars on the San Francisco & San Mateo Electric Railway climbed a 14 per cent grade during a fire blockade recently. The heaviest grade they ascend in regular operation is 11 per cent.

SOME EARLY TYPES OF TRACK CONSTRUCTION.

The street railway is of American origin and it is but natural that it should here find its highest development. The American street railway grew primarily out of the bad condition of our city streets which made omnibus traffic expensive and unpleasant. To-day we find that our fore-

fathers "built better than they knew" when they started this method of municipal locomotion, for it proved to be capable of taking care of traffic in a far better way than ever would be possible with busses even on the best of streets, and, what is more, made possible the evolution of mechanical traction. The growth of the interurban brings forcibly to mind again the fact that it is cheaper to build a railroad than a good

wagon road, and cheaper to operate upon it after it is built.

The construction of the first American street railways was patterned after the tramways used in connection with mining operations. One of the earliest forms of these coal mine tramways is shown in Figure 1. The rails are simply timbers laid on cross ties. Cast iron was the first metal used for rails. The form of these rails was as shown in Figure 2. It is notable that these castings were not made with the sole purpose of making a hard surface to take the wear of the wheels

but with the idea that it was a good form in which to put a stock of pig iron which could be taken up and sold

when the price rose.

The first American street railway was the New York & Harlem line laid in 1832. This was laid to our present standard gage; strange to say it was unpopular

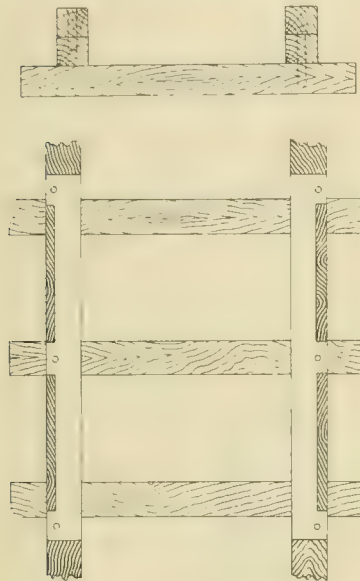
and was suppressed. In 1852 street railways were revived again in New York. The rails used on these early New York roads were of the types shown in Fig-

ures 3 and 4. In 1856 rails of the form shown in Figure 5 were laid in Boston. It will be noticed that the groove is not as deep as in the New York rail. Philadelphia seems to have been the first city to introduce what is now commonly known as the tram rail which determined the form for the majority of street railways in this country and was the rail head imitated by the modern girder rail. This rail (Figure 6) was laid in 1855. Its weight was 46 pounds to the yard and the gage used was

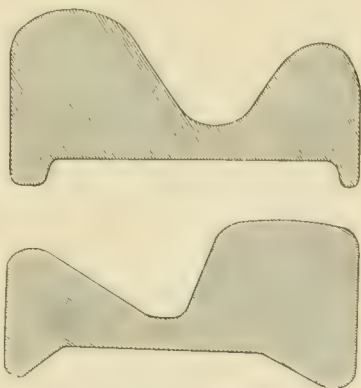
5 feet 2 inches. Thus Philadelphia set the fashion in rails but not in gage. The method of laying the Philadelphia track is shown in Figure 7. From this track to that in vogue before the girder rail came in is but a step. The first street railway in England was laid by the noted George Francis Train and Charles Hathaway, at Birkenhead. This was similar to that used in America, and is shown in Figures 8 and 9.

English practice, however, rejected the step or tram rail and adopted a grooved rail, while American practice retained it. The reason for this may be found in the relative importance of street railways in the two countries. In America they play a vitally important part in our everyday life and the convenience of the public patronizing the street cars is more important than the convenience of vehicular traffic. Hence a form of rail survived in this country which allowed

of a greater certainty of operation in freezing winter weather than would be possible with a grooved rail. In England omnibuses played such an important part that



FIGURES 1 AND 2.



FIGURES 3 AND 4.

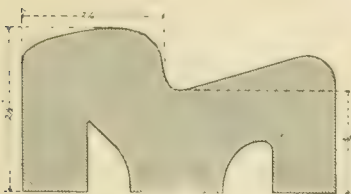
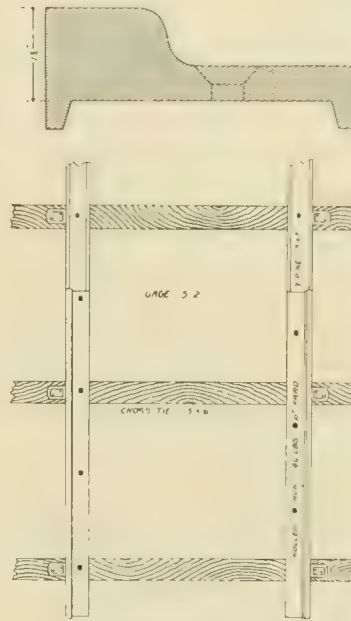


FIGURE 5.



FIGURES 6 AND 7.

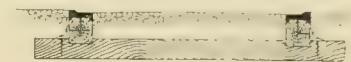
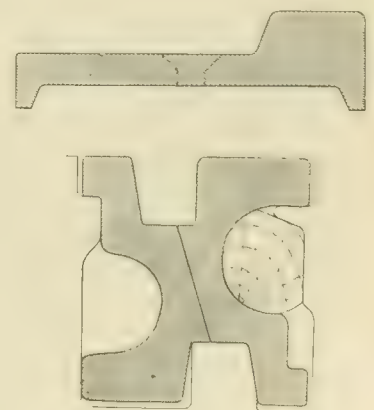
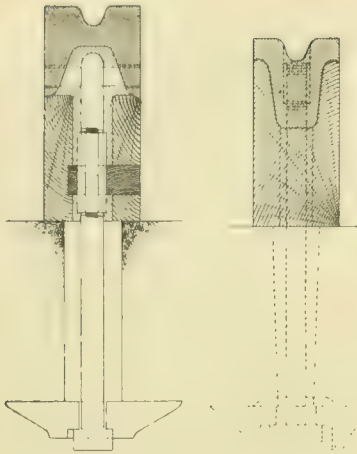


FIGURE 8.



FIGURES 9, 10 AND 11.



FIGURES 12 AND 13.

being that of the grooved rail. The grooved girder is now of course supplanting everything else, however. A most peculiar form of rail was laid on the London tramways in 1879. They were steel rails laid in two parts. They rested on cast iron chairs which held the two parts together. (See Figures 10 and 11). Liverpool seems also to have been the scene of some peculiar rail laying. Figures 12 and 13 show some work that was laid about seventeen years ago. The illustrations used herewith are from Clark's classic work on tramway construction and are an interesting and curious collection.

INTERNATIONAL FARE REGISTER.

More is required of a fare register than simply to show the number of fares rung up. It should be arranged so that it is impossible for anyone to tamper with it, unless

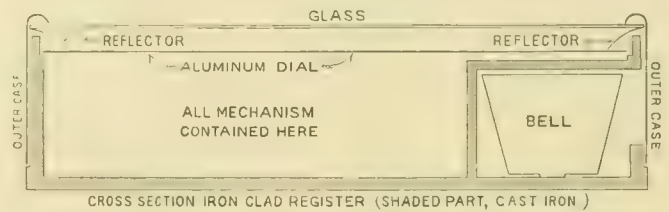


some sign of such tampering is manifest, and it should be easy of access to the proper person. The new International stationary register is really an iron pot surrounding

tramways were not so much a matter of necessity and the climate was more favorable. Hence the uncertain and unsatisfactory grooved rail came into use.

The tramways of England show an immense variety of rail laid on stringers. The surface presented to traffic and the street is, however, much the same in all,

the interior mechanism of the register, which is entirely sealed in the case. There is a spring sealing arrangement which holds down the dial and glass face, consisting of a pin which locks in a slot, after lugs at three



points of the register are in place. The hole in the outside through which the pin is reached, is covered by a piece of glass, on which is pasted a paper with the signature of the treasurer or proper officer to inspect the register. In order to gain an entrance it is necessary to break this glass and tear the paper, and push a pin which unlocks the glass covering of the dial, which can be

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removed and the interior of the register exposed. There are no screws to be removed or replaced, as the unlocking pin

being pushed against a spring releases everything that covers the mechanism.

Even the bell is covered with a hood, which has an opening only large enough to strike the outside of the bell. The conductor nor any other person can puncture the register, as the protection extends one-eighth of an inch above the dial. The dial itself is pure aluminum with satin finish. The register is manufactured by the International Register Company, 197 South Canal street, Chicago. A. H. Englund, secretary and manager, says it is the only register that can be taken apart without unscrewing a number of screws.

A new feature is a red tell-tale or curtain that is pulled down, closing the opening through which the number on the trip dial is seen, until the dial has been turned to the proper point, when the curtain moves back and the figure is exposed. The gearing is all cut, and there are few springs, the action of all being positive. The permanent register will totalize 100,000 and the trip register 299 fares. The illustrations show the register complete, a sectional view of interior, and specimen trip figures actual size.

Map of the United States.

A large handsome map of the United States, mounted and suitable for home use, is issued by the Burlington Route. Copies will be mailed to any address on receipt of 15 cents in postage by P. S. Eustis, Genl. Pass. Agent, C., B. & Q. R. R., Chicago, Ill.

STREET RAILWAY WHEEL TREADS AND FLANGES.

Is a Standard Desirable?—Is It Practicable?—If So, What
Should It Be?

PART I.

A standard tread and flange for street railway wheels is not a necessity, and hence no move has ever been made to adopt one. It does not follow that such a move is not desirable. However, before discussing the advantages of such a standard, let us consider the objections. One man wants a thin shallow flange because he is operating on a grooved rail. How many roads in this country are operating over a grooved rail that requires a very thin shallow flange? Not one per cent. Another wants a deep flange for conditions approximating steam road practice. Is there any evidence more than a theory that such deep flanges are a necessity? If there is it should be unearthed. Another objection is that some want a broad tread and others a narrow. Practice favors a tread the same width as the rail head. If this practice is wrong, it should not be used in the standard wheel, and nobody should desire to use it. If it is right, why should there be any deviation from it? In other words, the standard wheel, if adopted, should be a combination of the best teachings of experience. Conditions are not so widely different but that one or possibly two standards can be adopted which will suit all cases. There is absolutely no reason for the greater part of the variations in practice which exist at present. Why should half a dozen roads operating under exactly the same conditions require half a dozen different forms of wheel flanges and treads.

The ultimate advantage of a standard would be cheaper wheels. The immediate advantage would be an investigation of the results of practice before a standard was adopted, and, as a result, a knowledge of what is the best wheel for service.

The main reason for the diversity of practice at present is not because of the results of experience, but because every man has his own theory as to what is the proper wheel. Accordingly, there are hundreds of patterns, only a few of which can be the correct form. One well known superintendent expressed the opinion recently that a bevel was absolutely necessary to success in street railway operation, and that, in fact, so dependent is success on the little things, that street railroading would have been a failure had it not been for the bevel on the wheels. That was stating it rather strong, especially in view of the fact that some men do not believe in any bevel whatever, and are operating successfully with wheels having a flat tread. It is hard to determine what led to the bevel of wheels originally on steam roads, but very likely it was the greater ease with which they could be drawn from the chills in which they are cast. The efficacy of the bevel is by no means established. On the anti-bevel side may be mentioned some of the large systems of St. Louis, and the Denver Tramway Company. The

opposite extreme is represented by the Chicago City Railway, which has a very large bevel on its wheels, and is laying beveled rails to correspond. So it will be seen that on one of the first and most important points to come up when the question of a standard wheel tread is broached there is a difference between the best of authorities. Which is right? A standard ought to be adopted, if for no other reason than to cause an investigation as to what is actually the best wheel tread and flange. The rail heads used by street railways whether on T, girder, or grooved rails are now nearly all of the same shape, as regards the part on which the wheels and flanges have contact. Girder rails are flat headed and modern T rails are the same. There is therefore not the difficulty of a variety of rail heads to stand in the way of this reform.

To show the feeling among car wheel founders as well as the great diversity of wheel treads and flanges used, we quote from some of the correspondence we have received, as well as illustrate a few of the innumerable variety of wheels cast.

New York Car Wheel Works:—"There being such a wide diversity in the opinion of different street railroad men in regard to the width of tread and depth of flange to be used, we have never attempted to fix any standards of this kind, but have supplied wheels with flanges varying in depth from $\frac{3}{8}$ -inch to $\frac{7}{8}$ -inch, and with tread varying in width from $1\frac{1}{2}$ -inch to 3 inches. It is apparent to us that street railway companies will be compelled to arrive at some standard tread and flange in the near future, and for such a standard we would recommend using a wheel with a flange $\frac{3}{4}$ -inch in depth having a maximum thickness of 1-16-inch, and a tread $2\frac{1}{4}$ -inch in width, taking both measurements for width of tread and thickness of flange from the gage line. We would lay especial stress on the necessity of having flanges of proper thickness, on account of the expense involved and the danger to railroad companies of having flanges break in service. As you are probably aware, electric street railway service imposes severe conditions upon car wheels, and in order to have a wheel make satisfactory mileage, carry the car and stand the wear imposed by the traction and heavy brake service, we have found that it is necessary to cast a wheel with a chill at least $\frac{5}{8}$ -inch in depth. To obtain a safe flange with proper depth of chill we have found by careful experiments that the section through from the gage line should be 1-16-inch. In regard to wheel gage, the point from which we take this measurement is where the radius of the throat and flange meet, as this is the exact point where the wheel comes in contact with the inside of the rail below the ball. For a 4-foot $8\frac{1}{2}$ -inch track, a 4-foot $8\frac{1}{4}$ -inch wheel gage measured from this point, is, we consider, a suitable one for all street railway service, and we do not think that any variations from this standard are necessary.

We enclose you herewith blue print showing the dimensions of our standard motor wheel, and also showing point on the wheel from which we measure the



FIG. 1.

motor wheel is adopted, we would suggest using a $2\frac{1}{4}$ -inch tread and $\frac{3}{4}$ -inch flange. With the exception of this width of tread, the sketch gives our ideas of such a standard." (See Fig. 1.)

Fulton Truck & Foundry Company:—"We try to maintain a standard wheel in every way as near as possible, but where railroad companies desire a wider tread than our standard, we, of course, accommodate them in

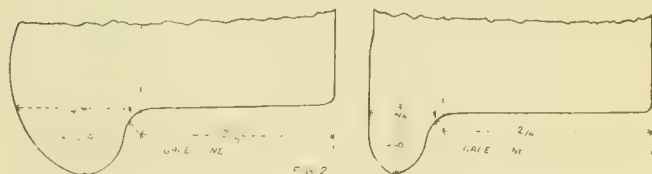
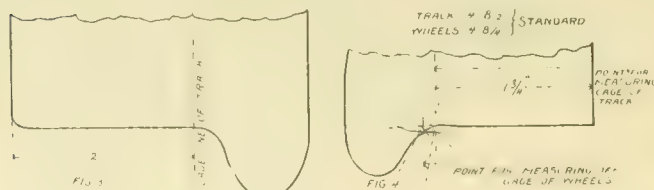


FIG. 2.

this. As far as the flange is concerned, we sell a $\frac{5}{8}$ -inch, 11-16-inch, or $\frac{3}{4}$ -inch flange. This usually covers the ground, as $\frac{5}{8}$ -inch are usually the lightest flanges asked for and $\frac{3}{4}$ -inch the heaviest. We have occasionally orders for wheels with 1-inch flange, but not very often." (See Fig. 2.)

Taylor Electric Truck Company:—"We enclose you a sketch which shows you clearly the style of wheel which we prefer, and which in our experience has given the best satisfaction." (See Fig. 3.)

John Stephenson Company, Limited:—"We have always been more or less bothered by the lack of harmony of view between the different wheel makers, and also between them and us, as to the point of the rail from which the standard gage should be measured. On



FIGS. 3 AND 4.

another sheet which we enclose herewith (Fig. 4), we sketch for you the theory which we have maintained as embodying the most practical method of measuring for greatest efficiency of service. It is not necessary here

gage and sketch of the M. C. B. wheel, showing how our gage line for motor wheels agrees with the gage line adopted by the Master Car Builders' Association. You will note that the sketch of motor wheel shows a tread two inches in width. As mentioned before, if a standard

for us to allude to the method of measuring adopted by the different wheel makers which will appear as the result of your communication with them.

"If out of the agitation some standard can be reached and accepted, it will solve a vexing problem, and be for the comfort and welfare of all concerned. We wish you success."

Baltimore Car Wheel Company:—"The accompanying sketch (Fig. 5) shows our standard tread and flange for motor wheels. This shape changes very rapidly in service, and it is quite probable that there would be no two wheels just the same shape after six months' service, out of 100 selected at random. This variation is due to many causes, such as varying degrees of hardness of the wheels or brake shoes, the conditions of track, shape and character of brake shoes, and condition of trucks. The point from which the wheels are gaged varies with nearly every make

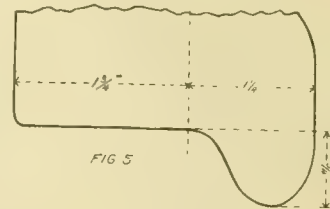
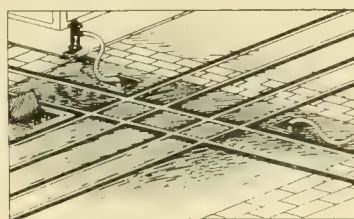


FIG. 5.

of wheels, and is controlled by the maker. We do not think that it will be possible to decide upon a standard tread and flange for street car wheels, as those parts of the wheels are formed in chills, and every wheel maker in the country has his standard, which was, presumably, decided upon as the result of his own ideas and experience. Should he have to change this it would entail great expense, without, in our judgment, benefiting any one. This service is entirely different from steam service, where there is a continual interchange of cars, and where a standard is made necessary in order that parts of cars broken away from home may readily be replaced at the point where the breakage occurs. This is the only reason that all parts are standardized in steam service, and as this reason does not exist in street railroad-ing, where cars only run on one line, we do not see any advantage to be derived from attempting to standardize wheels."

TO PROVIDE FOR HOSE AT FIRES.

The accompanying illustration explains the idea of



Fisher Ames of San Francisco as to providing for hose at fires. A permanent pipe is laid under the tracks and brought into manholes at the ends. Connections with the hose are made at the manholes. The serious objection is, of course, that it increases the number of manholes and piping under a street to an enormous extent.



Interesting Bits of Information from all Parts of the Country,
Boiled Down for Busy Readers.

Pittsburg calls vestibules, cabins.

A public park will be opened at Columbus, Ind., by John S. Crump, proprietor of the street railway.

A fender consisting of two rollers and a steel wire net has been invented by M. Ramasseur, of France.

The Milwaukee Street Railway Company's general offices have been removed from New York to Milwaukee.

The report that the South Bend, Ind., Street Railway has changed from electricity to mules, is an unadulterated fake.

George B. Lindsay has been elected president of the Chester Traction Company, Chester, Pa., succeeding S. A. Dyer, deceased.

The new electric lines in and around Baltimore and the eight power houses will cost, it is said, a total of \$3,245,000, not including rolling stock.

A conductor at Pawtucket, R. I., was shocked by touching a lantern on top of the car and thrown to the ground. He was not seriously hurt, but his loose change was scattered.

A bill requiring street railroad corporations in cities of more than 100,000 population to pay into the city treasury 15 per cent of the gross receipts, has been introduced in the Indiana State Legislature.

An extensive interurban electric railway has been projected to connect the Ohio towns of Steubenville, Winterville, Richmond, Amsterdam and New Philadelphia. John Kilgore is pushing the scheme at Steubenville.

Conway, Mass., has a new electric road. The power house is thirty-seven feet square and contains a McIntosh & Seymour engine of 100-horse-power and an Edison 90-kilowatt generator. The road cost \$50,000 all complete.

Long distance electric transmission will be used to develop the water power at Conowingo, Md., and make it available at Baltimore. The Susquehanna River Electric Company has been organized at Baltimore to carry out the plan.

A local freight railway, connecting wholesale houses with railroad depots, has been devised for Cleveland, O., by H. H. Gilbert, a coal merchant. Electricity is to be the motive power. The object is to do away with the heavy expense of cartage.

The Engineering Society of western New York has been organized with headquarters at Buffalo. George E. Mann is president; E. B. Guthrie, vice-president; Walter McCulloh, junior vice-president; and George R. Sikes, secretary and treasurer.

The Montreal, Quebec, papers, speak highly of A. J. Corriveau for keeping the electric lines of the Park & Island Railway Company open under adverse circumstances during the recent severe blizzard, when the snow was six or seven feet deep in places.

What may be termed a double-action accident occurred in Grand Rapids recently. Seeing that a collision with a wagon was inevitable the motorman reversed the motor. The controller was torn off in the crash, and the car ran backwards, killing a horse.

Alarmed by newspaper reports on the deadly and horse-frightening trolley, a cautious citizen of Moreland, Pa., hit upon a plan to familiarize his horse with the trolley sounds. He hung a gong in his stable and rings it now and then by wire from the house.

There has been a change in the management of the Lakeside Electric Railway Company, Shenandoah, Pa. W. N. Anderson and B. L. Halfman, Philadelphia, have bought large interests and are respectively president and secretary. D. D. Phillips is general manager.

Skating on the bay at Hamilton, Ont., is made possible by the Hamilton Street Railway Company. Manager T. B. Griffith keeps a wide strip across the bay clear of snow, and at night it is illuminated by a powerful search light on top of the company's power house.

A good use for worn out horse cars has been discovered by Manager Campbell, of the Winnipeg, Man., Electric Street Railway Company. The old cars are used as waiting rooms along the line and in outlying districts. They are heated and otherwise made comfortable, and are greatly appreciated by the public.

Five cents alleged overcharge caused John Gillen to sue the Brooklyn Heights Railroad Company for \$50 penalty. The company charged him ten cents for his ride, whereas an act passed in 1857 limited the fare for a continuous ride to five cents. The old act was repealed in 1890, and the present law provides no penalty, so he lost his case.

While sailing vessels often have to stop or "lie to" on account of strong winds, it is very seldom indeed that street cars are stopped by any wind, however strong. Nevertheless, at Houston, Tex., December 28, every car was stopped by the north wind, and for hours stood stalled on the tracks. The water had been blown out of the bayou whence the boiler supply is pumped.

A citizen of Elkhart, Ind., objects to the running of an electric railway feed wire through the trees in front of his yard, because, "should one be sprinkling the road and raise the hose (as you often see done to allow a team to pass) and the water come in contact with the wire where the insulation is worn off, the current would pass down and kill the person having hold of the nozzle of the hose."

Senator W. H. Austin has introduced a bill in the Wisconsin legislature to compel street railways to pay to the municipality, in lieu of taxes, 3 per cent of gross earnings exceeding \$350,000 a year; from \$250,000 to \$350,000, 2½ per cent; below \$250,000, 2 per cent. If a line is in two or more municipalities, the money shall be apportioned among them in proportion to the amount of track in each.

Superintendent Baumgarten, of the new Freeport, Ill., electric road issues a forty-trip pass book for a dollar to typewritists, shop girls, and men and women employed in any occupation, but not to merchants or persons at the head of any establishment. Tickets are good week days, between 6:35 and 8:35 a. m., and 5 and 7 p. m., and two are accepted for rides on Sunday and on week days at other hours than those indicated.

Trolley parties are the fad in Montreal since the palace cars for this purpose were introduced by the Park & Island Railway Company. Hardly a week elapsed from the time the first trip was made before a score of parties were organized to visit various resorts. Back River is now so easily reached over the company's lines that many go there to skate, and a skating club has been formed by prominent residents of the suburb.

Always studying how best to serve the public the Montreal Park & Island Railway Company has inaugurated a special service whereby passengers over the Canadian Pacific Railway, who enter or leave the city by the Dalhousie square station trains, are saved from twenty minutes to half an hour's time. Motor cars meet the train at the outlying station of St. Louis de Mile End and reach the center of the city twenty minutes ahead of it.

Albert J. Corriveau, of the Montreal Park & Island Railway Company, Montreal, has sued W. S. Williams, New York, for \$118,750 of stock which, it is alleged, he holds illegally. Mr. Corriveau secured all the franchises for the company, making an agreement with Mr. Williams that he should furnish the capital, and that each should receive stock. It is charged that Mr. Williams did not fulfill his part of the agreement, so is not entitled to the stock.

Steady patrons of the Orange and Newark, N. J., trolley line have been given little blank books by an improvement association in which to note all cases of bad service, condition of cars and neglect of employes. The books will be gathered up at the end of the month

and new ones issued, when the facts will be brought to the attention of the managers. The company will probably never hear from the books, as it isn't likely they will be used.

Henry C. Payne recently stopped the mouth of a Polish alderman by a flash of wit. The alderman, who is a saloon keeper, introduced an ordinance to compel the street railway company to charge only four cents, giving as a reason that times were hard, and the poor ought not to pay full fare. While the measure was being discussed Mr. Payne said to the alderman, "On the side, now, have you cut down the price of drinks a cent in your desire to assist the laboring people?" The alderman was speechless.

While President Lenex and Secretary Crouch were at work in the office of the New Orleans & Carrollton Railroad an elderly man, well dressed, walked in, and in a business-like way offered to give \$5,000,000 for the road and to produce the money in cash at once. The officers were amazed and said they would have to call a meeting to decide about it. The man said he would be back to settle the bargain. In the evening he came back and said he would only give \$4,000,000. That was the last seen of him. Evidently the man was insane.

A ride on an inclined railway is a hair-raising experience to strangers. A family party boarded a car on the Mt. Auburn Cable Railway, Cincinnati, on their way to the zoological gardens. All went well until the foot of the incline was reached. There the mother with the youngest daughter deserted the ship, and making a dash for the exit she cried, "Come on, Jim; we'll all be killed if the car goes up that hill." But Jim was out for his money's worth and stuck to the car. He motioned and called to the seceders to "walk around." When the top of the hill was reached, Jim, seeing that the others could not continue the trip on that car, got off, exclaiming: "That skeeriness of theirs is going to cost us another quarter."

A motorman on the Winnipeg, Man., Electric Street Railway had a bad scare recently. A boy ran out to the middle of the track just as a fast running car approached and remained there regardless of the ringing of the gong. The motorman set the brakes hard, but was unable to stop. As he passed the spot where the boy stood a cap flew up over the car. He almost fainted. When the conductor came around to the front end of the car he said "I guess we have killed a kid." "I saw his cap fly up in the air." While they were looking under the car for the mangled remains a wild shout of glee was heard. Looking around they saw the identical boy dancing around and laughing. He pointed up in the air, and there, hanging to the wire, was his cap. When the boy went out and stood on the track another boy stood on the sidewalk and held a string which passed up over the wire and down to the boy's cap. The boy on the track dodged and the other pulled the string.

STREET RAILROADING IN ARIZONA.

Street railway men who have been troubled with snow this year, will find it restful to look at the views on this page, most of which were taken on November 30, of last year, on the line of the Phoenix City Railway Company, Phoenix, Ariz. Summer lasts nearly all the year, so there is no falling off of travel on account of winter's chilling blasts. The Phoenix City Railway Company was organized February 28, 1893, by Gen. M. H. Sherman, president. With him is associated as vice-president, C. F. Ainsworth; treasurer, William Christy; secretary and manager, B. N. Pratt. About the first construction work of the company was to tear up the tracks of the old Val-

with Sprague 15-horse-power motors, four trailers and four horse cars. The power house is a short distance from the line, adjoining the city water works plant, both companies using the same boilers, thereby lessening expense of operating for both. The equipment consists of three No. 16 Edison generators, driven by one 300-horse-power Cumner engine, and one 75-horse-power Williams high speed compound engine.

Phoenix is the capitol of Arizona Territory, and county seat of Maricopa county, with a population of about eleven thousand, and is altogether a lively city. The company, however, does not depend for revenue upon the travel that naturally comes to it, but has various attractions to help create travel, some of which are shown



VIEW THROUGH PHOENIX PARK.
LOADING UP.

CAPITOL GROUNDS.

BICYCLE TRACK PHOENIX PARK.
CORNER PHOENIX PARK.

ley Street Railway, on Washington street, the main thoroughfare of the city, and lay five miles of 30 and 35-pound T rail for electric service, leaving about three miles of horse railway on other streets. The rails were spiked direct to 6x8 redwood ties, ballasted with six inches of river gravel. Special care was given to the joints, which are "standing up" well under service, though the cars are comparatively light. The line is perfectly straight and practically level, covering the main street of the city, passing nearly all of the principal hotels, business blocks, and going directly through the capitol grounds of the territory, about three-fourths of a mile from the city center.

The rolling stock consists of four motor cars, equipped

in connection with this article. Among them is a large park a mile and three-quarters from the business center, containing one of the fastest four-lap bicycle tracks in the west, and holding many of the Pacific Coast records. At the entrance to the park is a quaint building, in which is built a large cement tank, 30 x 100 feet, with a depth of three to six feet, holding 100,000 gallons of water. For seven months of the year it is known as the "Park swimming baths," and is a first-class drawing attraction. Separate days and times are set apart for ladies, and for ladies and their escorts. Five months of the year the tank is covered with a roller skating floor, which, for the comparatively short time it is used, draws well.

People seem never to tire riding round and round the

line in the almost perpetual summer evenings that exist in this region. With apparently no objective point in mind, they ride about evening after evening. Especially is this true of the Spanish and Mexican population, which would give the last nickle for a ride on the electric cars.

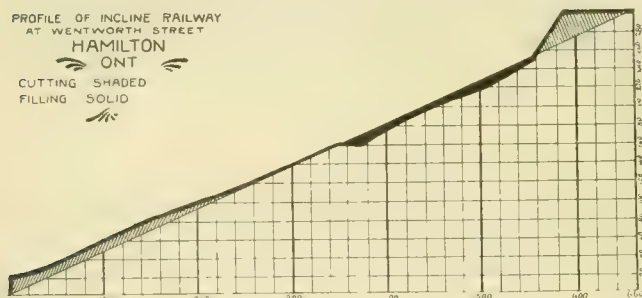
THE NEW INCLINE RAILWAY AT HAMILTON, ONT.

The city of Hamilton is beautifully situated on Burlington Bay, a land locked sheet of water about seven miles in diameter at the head of Lake Ontario. Back about three miles from the shore the land suddenly rises about 300 feet. At the top of this bluff or incline which is known as Mount Hamilton, is a level table land stretching south to the shores of Lake Erie 40 miles away. This table land is an excellent farming country. Hamilton being a city of 50,000 inhabitants a great deal of the farm traffic goes that way. To accommodate this, one incline was built two years ago, enabling farm wagons and passengers to be lowered down to the city from the summit of the mountain without taking any of the several steep and dangerous roads over which it was impossible to go with a heavy load. This incline catered to the traffic southwest of the city. Those living south and east, however, had to go out of their way to reach this or take a very rough road called the "Jolly Cut." Many found it a "Jolly Go" to get down at certain seasons with a load. Hence the demand for another incline railway down the mountain in the southeast part of the city.

John W. Lake, formerly of the firm of Lake & Clark, brokers, Toronto, and now of Hamilton, investigated the

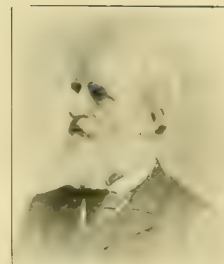


J. T. MIDDLETON.



matter of a second incline, and found that the greater part of the vehicles coming to the city on market days passed within 500 feet of a desirable point for a new road. This location was a mile east of the other incline, and the track could be laid with very little cutting and filling. Besides the advantage of this location, from an engineering standpoint, and on account of farm traffic, it was a good point for pleasure traffic because of the beautiful

drives at the upper end and the fine view of the lake and surrounding country. As the city grows it will prove a magnificent location for fine residences. A strip of land 130 by 900 feet was bought outright, so as to be free from trouble with the city or private property owners. The East Hamilton Improvement Company was formed, with James T. Middleton, M. P. P., president, and John W. Lake, secretary and treasurer. John Fensom, a well known consulting engineer of Toronto, was employed and work began in October. It is now nearly done. As seen by profile, the incline is 700 feet long with a vertical rise of 300 feet. The cars are to weigh ten tons each, and can carry two double wagons or four buggies. This necessitates a track of 12-foot gage. The ties are 6 by 10 inches and 16 feet long. The road-bed is 44 feet wide. The rails are the standard 80-pound T, used by the Grand Trunk. The passenger part of the car will be fitted up in much the same manner as a street car. Two cars are to be run, one balancing the other. A hauling cable of 1½ inches and a safety cable of the same diameter will be used. A double engine of 400-horse-power is used. The ascent with heavy load will be made in 1¾ minutes and with light load in one minute. An average of one hundred teams a day is counted on. The fare will be twenty cents a round trip for vehicles and five cents for passengers, or eight for twenty-five cents.



JOHN W. LAKE.

BIG BLAZE AT BOSTON.

At midnight, January 16, fire broke out in the Columbus avenue car house of the West End Street Railway Company, at Boston, Mass. Within half an hour the entire structure was in flames. The building, which was of wood covered with sheet iron, and one-story high, was completely destroyed, together with fifty electric cars. Stored in the building were twenty-five closed cars with motors, and thirty-five summer cars without motors. Only a few employes were about when the fire broke out, and it spread so quickly that scarcely a dozen cars were saved by them before they had to run for their lives. At one time the fire threatened to spread to the adjoining car house at Lenox and Tremont streets and the cars were hurriedly run out on the streets in the vicinity. The loss is \$9,000 on the building and \$100,000 on the cars, covered by insurance.

During the severely cold weather of January the employes of the South Covington & Cincinnati Street Railway Company were relieved every two hours and given hot coffee and sandwiches. For this kind thoughtfulness on the part of the officials the men were very grateful. Over 200 of them joined in signing a spontaneous testimonial of thanks.

FORFEITURE OF FRANCHISES.

The clouds that envelop street railway franchises are being cleared away by the state courts. In the suit of the Santa Rosa City Railroad Company, of Santa Rosa, Cal., against the Central Street Railroad Company, over conflicting rights to maintain a street railway in a certain street, several points of state law have been made clear.

Since 1877 a railway has been maintained on the street in dispute by the Santa Rosa City Railroad Company. On September 2, 1891, a franchise was granted by the town council to the Central Street Railroad Company, to construct a railway on the same street. When the new company attempted to remove the old company's tracks, suit was brought by the latter for an injunction and damages.

A decision adverse to the old company was given by the superior court. It was claimed that it never received a valid franchise, and that the franchise was forfeited because the provisions of the state law, requiring work to begin within one year and to be completed within three years, had not been complied with. In reversing this decision of the lower court, the supreme court handed down the following opinion:

"If this statute, *ex proprio vigore*, produces a forfeiture without further legislative or judicial action, it does so absolutely and unconditionally.

"If the grantee of the franchise should commence the work within the year, and thereafter diligently prosecute it, and should, within the three years, complete it with the exception of a single block, its entire road would be forfeited, even though its failure to complete that block should be caused by the occupation of the city by hostile troops, or by a destructive pestilence, or any other cause entirely beyond its control. If on the very next day after the expiration of the three years it should complete its road, and thereafter operate it for ten years, it might then be ousted without redress. It might happen that such a road, in a small place, might be operated for many years only at a loss, yet the moment it became profitable a rival might step in and avail himself of a forfeiture occurring many years before, and never thought of by any one. The injustice which might be done in such cases would be avoided, and private as well as public rights protected, if resorts must be had to legal proceedings. It is, therefore, reasonable to suppose that the legislature in general intends that a forfeiture shall be enforced only by judicial action, or, in a proper case, by express legislative declaration, and that, when it intends otherwise, it will use apt and plain language to that effect. The language used in the section under consideration evinces no such intention, and until a judgment of forfeiture is obtained, or the forfeiture is declared by legislative authority, the franchise and right of way continue to exist.

"It is not necessary for the purpose of this case to decide whether, in a case like the present, a mere legislative declaration of forfeiture would be sufficient. The authorities do not agree as to when, if ever, a forfeiture

can be enforced in that way. It is sufficient to say that in this case no such legislative declaration was ever made by the city council or any other body. It is well settled that a mere grant to a third party will not of itself effect the forfeiture, and the ordinance granting the franchise to defendant expresses no such intention, and is not in any way inconsistent with the continuance of the plaintiff's franchise.

"From the principles above laid down it follows that no one but the government can avail itself of a ground of forfeiture of a public grant, and that the government, being the sole judge of the propriety of such action, may waive the right to enforce or declare a forfeiture. Such waiver may be by express legislative action, or may be inferred from other acts of the governmental authority. Accordingly, when the state or any subordinate governmental body to whose charge the matter has been committed, after knowledge of the act or omission constituting a ground of forfeiture, does any act which unequivocally recognizes the franchise as still existing and in force, a waiver of the forfeiture will be inferred."

PAYS HIS FARE OR WALKS.

L. M. Erb, manager of the Leavenworth Kan., Electric Railway Company, has taken a firm stand in the matter of free rides. One of those whose demands he has turned down, is George Herron, the city collector. When refused transportation, this man Herron openly and defiantly said he would "make it interesting" for the company. Proceeding to carry out his threat, he introduced an ordinance in the city council which was well calculated to prove obnoxious to the company.

Turn about, is fair play. Mr. Erb at once "made it interesting" for Herron, but in a legitimate manner. His scheming for a pass, his threats to "get even," his base motives in introducing the ordinance, were exposed by Mr. Erb, in the daily newspapers, thus placing him in a most unenviable light before the public, in the following letter:

LEAVENWORTH, Kan., Jan. 4, 1895.—Last Wednesday George Herron, the city collector, called at the office of the Leavenworth Electric Railway Company to solicit a free pass, on account of what I do not know, unless he thought he was entitled to it as city collector. At all events his request was turned down, as well as a great many others, who had no more right to expect free transportation than they had the right to ask the company to pension them because they had possibly caught a severe cold by riding on the front platform.

Mr. Herron, on being refused transportation, openly and defiantly said that he would make it interesting for the company. If this man, Herron, should make it interesting, as he says he will, I presume he intends doing so by trumping up an ordinance entirely groundless, which he will attempt to have the city council pass upon. I desire to call the attention of the mayor and council to the fact that the ordinance introduced by Herron at the last

council meeting, was merely done for the purpose of making it interesting for the railway company.

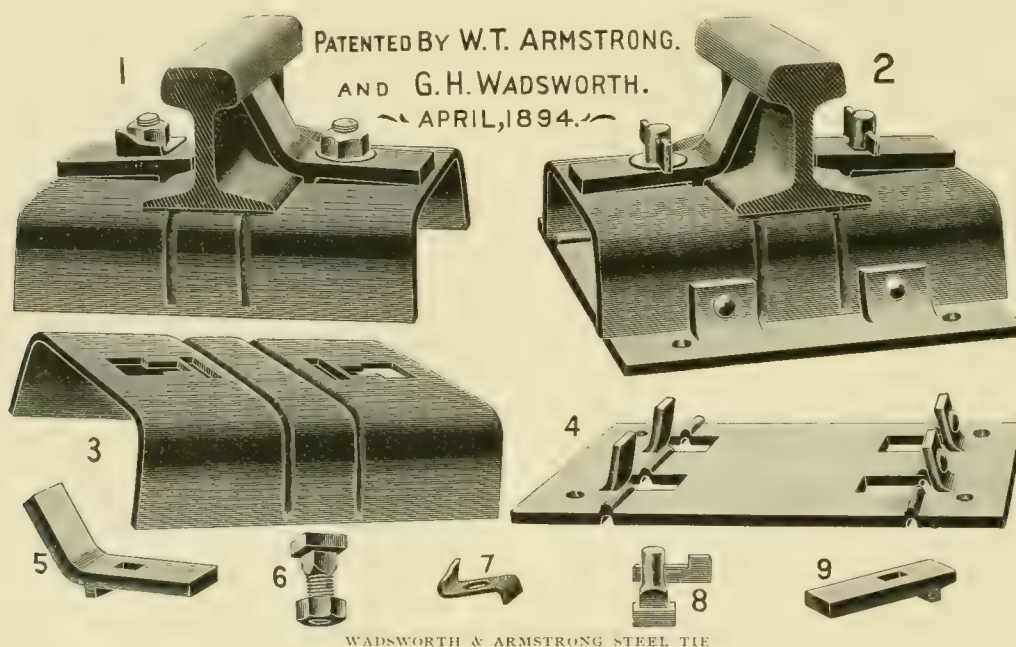
Am sorry, but Mr. Herron will have to pay his fare or walk.

L. M. ERB,

Manager Leavenworth Electric Railway Co.

WADSWORTH & ARMSTRONG STEEL TIE.

Steel ties are attracting more attention from street railway managers than formerly, especially as T rail construction is coming into more general use. The illustrations show the new Wadsworth & Armstrong steel tie for steam and street railways. The novel feature claimed is the fastening of the rails. Fig. 1 shows a section of the tie, corrugated where the rail rests, to keep the flanges of the tie from spreading or flattening out. Fig. 3 shows how the clamps, Figs. 5 to 9, and bolt fit into the top of tie, the strain coming on the dog and the tie inside of the bolt, which is put through the tie loosely



and made to drop into a large hole. All the parts are pushed forward in the narrow slot until the dog drops into place. Lost motion can be taken up by tightening the nuts on the bolt. Fig. 5 shows clamp for curves, and Fig. 9 for straight track. All fastening is done from the top, so it is unnecessary to dig under the tie, or displace cement, which saves expense. Fig. 8 is a split taper key, which may be used in place of nuts, while Fig. 7 is a simple lock washer that may be bent after the nut is tight. Plate Number 4 is made to give a solid bearing where ties are used on bridges. Engineers who have used the tie recommend it. The Avery Stamping Company, Cleveland, O., is prepared to contract with steam railways and street railways.

The Market Street Railway Company of San Francisco is having 110 trolley cars built. These cars will have single trucks and glass protection for the motorman.

ELECTRIC RAILWAY AT GARDNER, MASS.

The Gardner Electric Street Railway Company, Gardner, Mass., is completed. It is a belt line, three and one-half miles in length, connecting three villages with the depot of the Fitchburg Railroad.

The first project to build an electric street railway in Gardner was broached in 1890, when a company was formed to secure the franchise. Soon after a rival company was organized. Nothing came of these projects, and matters lay dormant until the fall of 1893, when M. A. Coolidge took hold. The Gardner Electric Street Railway Company was incorporated, with F. S. Coolidge, president; E. F. Blodgett, vice-president; J. A. Stiles, treasurer, and M. A. Coolidge, superintendent.

The contract for building the road was awarded to F.



M. A. COOLIDGE.

A. Hobart, of Braintree, who began work in June. The car house contains, in addition to the tracks, a waiting room, superintendent's office, and workshop. Adjoining the car house, which is 36 by 90 feet, is the power house, of brick, 35 by 40 feet. The generator is driven by a 16 by 18 heavy duty center crank engine, which takes steam from a 66 by 16 return tubular boiler. The generator is a multipolar, wound for 500 volts.

The rolling stock consists of three open and three closed cars, mounted on single trucks, and built by the Jackson & Sharp Company, of Wilmington, Del. The cars are equipped with Columbia heaters, made by the McGuire Manufacturing Company, of Chicago, and with the New Haven fare register, made by the New Haven Car Register Company, of New Haven, Conn.

A scenic electric railway is to be built at Ludlow, Ky., after plans by Col. L. A. Thompson, of San Francisco.

LOST ARTICLES

Anything relating to Montreal is sure of attention this year of 1895, on account of the choice of that city as the meeting place of the American Street Railway Association. The city has an excellent street railway service, which will be better known in October than it is to-day.

(F. S. 163)

No. _____

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The following, found on Cars, have been handed into this Office:

DESCRIPTION OF ARTICLE.	Conductor's No. Or Name	Time Received

Receiving Office

NOTE :- Purses and any valuables to be at once delivered to Comptroller's Office

LOST ARTICLE REPORT BLANK—MONTREAL.

The method of handling lost articles is the particular branch of the service to which the REVIEW desires to call the attention of its readers. J. F. Hill, comptroller of the Montreal Street Railway Company, writes that the company has no special department for looking after lost articles, which are all turned in to the comptroller.

Four blanks are used to keep track of lost articles, which seem to be sufficient to answer every purpose. The conductor turns in articles found to the receiver's office, noting upon the back of his daily report the car number, trip number up or down, description of article and time handed into the office. The other blanks are bound in books, numbered consecutively with a stub of corresponding number. The receiver sends in a report showing description of articles, conductors' numbers or names and time received. Applications are recorded upon the blank shown herewith, upon which the history of the article appears. One of the illustrations shows the form used for answering applicants. If an article has been recovered a blank like No. 199 is sent out, if no trace is found No. 200 is mailed, while a stub gives the record for the company.

In addition to the articles most commonly lost, the conductors have picked up prayer beads, wheelbarrows, and an illuminated marriage address. All pocket books and money are turned in at once to the comptroller. Last year 1,825 articles were picked up most of which were returned to the owners. Articles of little value, such as umbrellas, are seldom claimed.

John J. Stanley, general superintendent of the Cleveland Electric Railway Company, writes: "Our conductors are instructed to turn into the office as soon as they reach the end of the line, any article which has been left in the car. Each article is labelled with the date, number of the car on which it was found and the number of conductor who picked it up. These articles are laid aside, and given out when the people call for and identify them. They consist mostly of pocket books and umbrellas, although we have had inquiries for almost every article from a hat pin to a gold watch."

In Detroit the Citizen's Street Railway Company uses a simple system. J. R. Stirling, secretary of the company, has sent us a description. "All articles recovered by conductors are tagged with a small tag on which is the date, number of the car, line and name of conductor. Articles are brought to the general office by the line superintendent. A complete description of the article is recorded in a book kept for that purpose. If articles of little value are not claimed within thirty days, they are returned to the conductor. Articles of greater value such as pocket books and watches are kept for a year. Among odd articles we have found are babies, baby carriages, fishing tackle, lunch baskets, medical cases,

Montreal Street Railway Co.

APPLICATIONS FOR ARTICLES LOST ON CARS.

No. **350** _____ 180

Name _____

Address _____

Article _____

Car No. _____ *Badge No.* _____

Line _____ going _____

Date _____ Time _____

Remarks. _____

[illegible]

SUPERINTENDENT'S REPORT:-

A horizontal timeline of the 1990s, from 1990 to 1999. The timeline is marked with years and includes several key events indicated by dots and labels:

- 1990
- 1991
- 1992
- 1993
- 1994
- 1995
- 1996
- 1997
- 1998
- 1999

Key events marked on the timeline include:

- 1990: The Gulf War begins.
- 1991: The Soviet Union collapses.
- 1992: The first Gulf War ends.
- 1993: The first Gulf War ends.
- 1994: The first Gulf War ends.
- 1995: The first Gulf War ends.
- 1996: The first Gulf War ends.
- 1997: The first Gulf War ends.
- 1998: The first Gulf War ends.
- 1999: The first Gulf War ends.

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Applicant advised _____ 189

.....

LOST ARTICLE REPORT BLANK—MONTREAL

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200

STORAGE BATTERY IN PARIS.

Montreal Street Railway Company
Application No. _____
Advice No. _____
COMPTROLLER'S OFFICE.
1894

With reference to your enquiry of _____
re lost _____
full enquiry has been made, but we have been unable to trace, and if you will call at this office we shall be glad to deliver you same upon proper identification.

Yours truly,
Comptroller

LOST ARTICLE REPORT BLANK—MONTREAL.

Montreal Street Railway Company
Application No. _____
Advice No. _____
COMPTROLLER'S OFFICE.
1894

With reference to your enquiry of _____
re lost _____
full enquiry has been made, but we have been unable to trace, and if you will call at this office we shall be glad to deliver you same upon proper identification.

Yours truly,
Comptroller

spectacles, novels, false teeth, and overcoats. (One lost by Mayor Pingree). The average is about five articles a day, four of which are claimed."

J. H. Robertson, superintendent of the Third Avenue Railroad Company, New York, says, "Articles of all descriptions are found in our cars almost daily, such as umbrellas, satchels, pocket books, articles of wearing apparel, both old and new, odd pieces of jewelry and many other things. When a conductor finds an article he attaches to it a memorandum of the date, time, trip, etc., and hands it in at the receiver's window where it is taken charge of; if there is anything on or about it by which the owner may be identified, he is communicated with, and if found to be the rightful owner, the article is restored to him. Articles that are not called for three months after being found are restored to the finder."

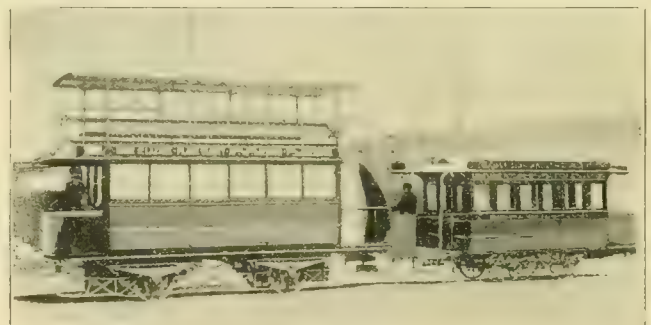
NEW ELECTRIC WORKS AT WOLVERHAMPTON, ENG.

Thomas Parker, Limited, has opened extensive works at Wolverhampton, Eng., for the manufacture of generators, motors and other electric machinery. The buildings include a pattern shop 80 by 40 feet, foundry 120 by 40 feet and a large building about 150 feet square. In the first bay of the large building are the main engines for driving all the machinery; in the second bay are the erecting and testing machines and large tools. The third bay contains lathes, drilling and milling machines. The fourth bay is reserved for armature-winding, brass-finishing, etc. The boilers are Babcock & Wilcox.

The district commissioners of Washington, D. C., have recommended the adoption of the Blakistone fender for all the street railways of the District of Columbia, to be used in connection with a wheel guard invented by Eldridge Smith, Washington. The fender, which was described and illustrated in the December STREET RAILWAY REVIEW, is the invention of President George Blakistone, of the Central Railway Company, Baltimore, Md.

They have two electric lines in gay Paris which are operated by storage batteries by the Compagnie des Tramways de Paris et du Department de la Seine, which is a big name for two roads, each only about five and three-fourths miles long, to carry. Two sets of batteries of 108 cells each are furnished for each motor car, charged with a constant potential of 26 volts. Each battery has eleven plates 7.88 inches deep, 7.88 inches wide, and about one-fourth of an inch thick, the weight of the active material being 38½ pounds. The capacity of the batteries is 230-ampere-hours, which, it is said, is sufficient to run the cars six hours, or from four to six consecutive trips, while the average distance traveled every day by each car is about eighty-four miles, at a cost of about 1.86 cents a car mile for current. The batteries are arranged under the car seats, and drive Manchester motors with Gramme ring inductors, two motors to each car, which are connected with the axles by two systems of gear wheels in the ratio of 12 to 1, the first series running in a bath of oil. Each motor is said to be capable of 1,350 revolutions per minute, developing a total of 10,000 watts at 200 volts pressure.

One line runs from St. Denis to the Madeleine and the other from St. Denis to the Opera. The generating



MOTOR CAR AND TRAILER, PARIS.

station is at St. Denis, and consists of three Desrozier's dynamos arranged in multiple, driven by three Corliss engines, each of 125-horse-power, and generate 230 amperes of current at 260 volts pressure.

The motor car and trailer shown in this connection are used. The motor car is mounted on two single-axle trucks, connected together by an arrangement of springs to allow the passing around curves. Each car has capacity for fifty passengers, and weighs when filled with passengers, including motors and batteries, about 13½ tons. The track in the suburbs is of 48½-pound Vignole rails, while in the city Broca grooved rails of 98½ pounds are used. It has been found that a single charging of the batteries will carry the car over about 75 miles of the light rails and about 40 miles of the heavy grooved rails. The climate of Paris is similar to that of Chicago, so that it is not difficult to make interesting comparisons. Batteries are removed from the cars by methods similar to those used on American systems.

STREET RAILWAY LAW.

EDITED BY FRANK HUMBOLDT CLARK, ATTORNEY AT LAW, CHICAGO.

Discrimination as to Rates.

That feature of the contract between the city and the New Orleans & Carrollton Railroad Company, which exacts from the public a fare of ten cents from Carrollton to Canal street, except from actual residents above Napoleon avenue, who can, on certain conditions, make the trip for five cents, is not subject to attack as an unreasonable discrimination prohibited by the laws governing the obligations of common carriers.

Plaintiff complains that he was illegally ejected from one of defendant's cars, for which he claims damages, and he prosecutes this appeal from a judgment which rejected his demand. The contract under which defendant obtained its present franchise was framed under the provisions of two ordinances of the city council of New Orleans, which contained the specifications under which the right of way was to be sold to the company, among which was the following: "*Fare.* The rates of fare from Canal street to the head of Jackson street and, the Napoleon avenue station and points between shall be five cents, and five cents beyond Napoleon avenue station between the hours of 4 a. m. and 12:30 a. m., except to actual residents above Napoleon avenue, who shall have the privilege of purchasing through tickets at the rate of ten for fifty cents. The fare between 12:30 a. m. and 4 a. m. to be charged shall be ten cents to Napoleon avenue and ten cents from there to Carrollton." In compliance with that stipulation, the company procured tickets in bunches of ten each, which it has been selling exclusively to actual residents above Napoleon avenue. It appears that plaintiff, who does not reside above Napoleon avenue, obtained a bunch of such tickets from a person who was an actual resident above the street, and attempted to ride on one of those tickets from the corner of Second and St. Charles streets to Carrollton. At Napoleon avenue, where the change of cars is effected, he tendered for his fare thence to Carrollton one of the coupons of the tickets in question, which was refused by the collector, on the ground that he was not a resident above that avenue. Being called upon to pay the regular fare, and persisting in his claim to pay the same by means of the ticket, plaintiff was ejected from the car. The crucial point in the case is the contested right of the company to make the discrimination hereinabove described, in favor of actual residents above Napoleon avenue, which is alleged to be unjust, unreasonable, and violative of the legal obligations of the defendant company as a common carrier. Hence the main relief claimed by plaintiff is a decree condemning the defendant to sell to him and other persons residing below Napoleon avenue tickets on the same terms and conditions which are extended to actual residents above Napoleon avenue.

It appears that the discrimination complained of does not emanate from the railroad company, but that it was imposed on it as a condition of its franchise, by the city. The leading feature of that stipulation is a limit of the maximum rate which the company can exact for fare

between the points therein designated. Under its requirement the company cannot obtain a higher rate than ten cents between Canal street and Carrollton, or five cents between Carrollton and Napoleon avenue, and between Canal street and Napoleon avenue, or the foot of Jackson street and intervening points. Under our law touching the powers of the city of New Orleans, it clearly appears that the city is clothed with the full and exclusive power of granting franchises for the construction, operation and running of railroads over its streets, as well as the power of fixing a tariff of rates to be enacted by all such corporations. But, conceding all these powers to the city of New Orleans, plaintiff contests the right of the city to make the discrimination complained of.

In our examination of the numerous authorities in which unreasonable discriminations made by common carriers were rebuked and avoided, we find that none of the acts complained of had any direct or indirect legislative authority, but that they antagonized either the general or common law governing the obligations of common carriers, or some special law applicable to the subject matter. The regulation which is here charged to be an unreasonable discrimination, far from being violative of a special law, is directly sanctioned by legislative authority. More than that, it is embodied in, and forms part of, a solemn authentic contract between the city and the defendant company. And the court is urged to cancel and abrogate a contract which the city had the undisputed power to make, and in a proceeding in which it is not even a party. According to the contract, the established rate of charges for all persons, is ten cents between Canal street and Carrollton each way, the exception being in favor of actual residents above Napoleon avenue. Hence it follows that if any unreasonable discrimination can be charged to the scheme, it must be attributed to the exception and not to the general rule, and therefore the judgment rendered could not benefit plaintiff, but would materially injure a class of people which the city intended to protect. It was, unquestionably, within the discretionary power of the city council, in regulating the defendants' road, to consider that as the majority of churches, schools, banks, courts and other institutions were clustered in the neighborhood of the center of the city, and almost all below Napoleon avenue, it was simply an act of justice to actual residents above Napoleon avenue, in the pursuit of their daily vocations, and for other equally necessary purposes, to enable them to reach the central portion of the city with the same facilities and at the same cost which were afforded to all other residents of the city.

(Supreme Court of Louisiana, *Forman v. New Orleans & C. R. Co.*, 4 Southern Reporter, 246.)

[NOTE.—The doctrine of the foregoing decision has been reiterated in the recent case of *Robira v. N. O. & C. R. Co.*, Supreme Court of Louisiana, 14 Southern Reporter, 214.—ED.]

Track in Street—Grant by Property Owner.

A grant to a street railroad of the right to lay a track on each side of the roadway, in a certain street, signed by plaintiff and the other owners of the property abutting on such street, does not authorize the company to lay its track outside the limits of the street, entirely on plaintiff's land, at a point where the street is too narrow to accommodate the tracks.

(Supreme Court of New York. *Curvin v. Rochester Railway Company*. 78 Hun. 535.)

Passenger Injured by Collision Between Street Car and Railway Car—Rights of Action.

One injured by a collision between a locomotive of a railroad company and a street car, in which he was a passenger, may maintain a joint action against both companies, if the collision was produced by the neglect of the railroad company to give notice of the approach of the locomotive, concurring with the neglect of the street railway company to observe proper care in crossing the railroad track.

Although such duties are diverse, and the neglect to perform each is separate and disconnected, yet, as the wrong doing of one company unites with that of the other, in causing the injury, the tort is joint, and one or both tortfeasors may be sued.

(Supreme Court of New Jersey. *Matthews v. Delaware, Lackawanna & Western R. Co.*, 22 Lawyer's Reports Annotated 261.)

Transfer Ticket—Mistake of Conductor—Expulsion of Passenger from Car—Liability of Company.

The action is to recover damages for an alleged assault upon the plaintiff while a passenger in one of the defendant's cars. The plaintiff took passage upon an Exchange street car, going to what is known as the "Four Corners," where he desired to take a West avenue car, paid his fare, asked for and received a transfer for that car. The plaintiff, at the Corners, boarded a West avenue car, and, when he presented the transfer ticket to the conductor, the latter refused to receive it, for the reason that it was past the time within which it was available, and asked the plaintiff to pay his fare; and on his refusal to do so or leave the car, the conductor took hold of the plaintiff to remove him from it, but before it was accomplished he paid his fare and was permitted to continue in his seat.

The conductor gave the plaintiff a transfer ticket, which purported to be good until 5:40 p. m. It was more than an hour after that time when he boarded the West avenue car. There is some conflict in the evidence as to the time the plaintiff got on the Exchange street car, but the jury were permitted to find that it was then 6.40 p. m., and as the passage of the car to the "Four Corners" only occupied two minutes, it must be assumed that the difficulty arose from the mistake of the conductor in attempting to indicate by his punch mark the time within which the plaintiff could continue his passage on the West avenue car. The conductor thus made it

appear that the plaintiff was not entitled to do it upon such transfer slip; and, in the observance of his instructions it was the duty of the conductor to whom it was offered to refuse to accept it and to require the plaintiff to pay his fare. The question is whether or not the plaintiff is entitled to the relief which he seeks by this action. While it is conceded that he may have his remedy for breach of the contract, it is urged on the part of the defendant that he has no right of action for the cause alleged, because the defendant had provided suitable regulations for the management of the business of conveying passengers, and the transfer of them from one to another line of its road so as to give to them the continuous passage on payment of a single fare as provided by the statute. This question has seemingly been one of diverse views of judicial writers. Among the cases in which the actions founded upon principle similar to that of the plaintiff's proposition in the present action, have been sustained, are the following: *Palmer v. Railroad Co.*, 3 S. C. 580; *Burnham v. Ry. Co.*, 63 Me. 298; *Ry. Co., v. Fix*, 88 Ind. 381; *Murdock v. Rd. Co.*, 137 Mass. 295; *Head v. Ry. Co.*, 79 Ga. 358; *Rd. Co., v. Riley*, 68 Miss. 765. And of the cases tending to hold to the contrary, are: *Yorton v. Ry. Co.*, 54 Wis. 234; *Frederick v. Rd. Co.*, 37 Mich. 342; *Bradshaw v. Rd. Co.*, 135 Mass. 407.

The latter case, and that of *Murdock v. Rd. Co.*, supra, may be distinguished by the fact that the familiarity of the plaintiff in the *Bradshaw* case with the practice of the company and the checks used by it, was such, that by inspection he would have observed that he had not received the one suitable to his purpose; while, in the other case, the plaintiff was assured by the ticket seller that the ticket entitled him to passage to his place of destination. In the present case the plaintiff was advised by the transfer ticket that it permitted him to take a West avenue car, and that he must do so within ten minutes, but he did not understand what was the meaning of the punch mark, which was intended to advise the conductor of that car of the time the transfer slip was issued. It must be assumed on the evidence, that the plaintiff took the first West avenue car that left the Corners after he reached there, and that he so informed the conductor. The plaintiff was given, by the statute, the right to a continuous passage to his place of destination on payment of the single fare, and it cannot be said that it was by any fault or neglect on his part that the right was denied to him. It is a general rule that a carrier of passengers is answerable for all the consequences to a passenger of the willful conduct or negligence of the persons employed by it in the execution of the duty it has assumed towards him. The defendant had, by its contract with the plaintiff, undertaken, for a consideration paid, to carry him to his place of destination, and pursuant to it, he had the right of passage and as between him and the defendant he was at liberty to refuse to repay his fare, and to insist upon having his continuous passage. In violation of that right, the defendant, by its conductor, proceeded to forcibly eject

him from the car in which he was rightfully seated as a passenger. Although the conductor personally may have been justified by his instructions to do so, the defendant was put in the wrong by the act of the other conductor, and was no more justified in the attempted act of ejection, than it would have been if he had at the time, had and presented the evidence of his right to remain as a passenger in the car without further payment.

(Supreme Court of New York. *Muckle v. Rochester Ry. Co.* 29 New York Supplement 732.)

ON CAR BUILDING.

St. Louis is acknowledged to be the street car manufacturing center of the world, says the *Globe-Democrat*. The output is something enormous, and is shipped to all points of the compass. For superior workmanship, style and elegance, other cities can not compete; then, too, St. Louis manufacturers have numerous patents on improvements, which counts for much in modern car building. One of the car manufacturing companies of this city, in a late circular, has the query: "What are specifications for?" And as the answers contain interesting information, are herewith given: "Most of the cars now building are not so strong in proportion to the usage they get as horse cars were; that is, if the life of a horse car were twenty years, the probable life of electric and cable cars, as they are now building generally, is perhaps not more than five or six years. Some railroad men will not believe that their cars are going to pieces so soon as that, but all will agree that car building has not kept up with car wear. Why not? We think the reason is that most car buyers make the mistake of relying on their specifications for the quality of their cars. We do not suppose that any car buyer really thinks that a builder builds any better because of the specification 'the work and material to be first-class throughout;' but he puts it in, and sometimes refers to it. You would not order a 'first-class' carriage of a common carriage-maker and rely on a phrase like that for the quality of it. You would not go to a cobbler and order a pair of 'first-class' shoes and expect better work than the cobbler is used to. It means exactly that what the tailor, or cobbler, or carriage-maker, or car builder is used to. How are you going to hold a low-grade maker for high-grade work? It can not be done. If you want good cars, the way to get them is not to smuggle into your specifications a clause that costs you nothing, but go to a builder that builds good cars and order them."

W. C. Sterling & Son, of Monroe, Mich., are shipping a trial order of telegraph poles to Buenos Ayres. Owing to the peculiar conditions affecting ocean transport, the poles will, after delivery at New York by rail, be carried to London, Eng., by steamer, and there transhipped into a South American steamer, which will carry them to Buenos Ayres. If the poles arrive safely, the Messrs. Sterling are promised large orders.

S. L. NELSON'S VESTIBULE.

In Ohio a law has been passed, which has been declared constitutional, requiring all street railway companies to place vestibules on their motor cars. S. L. Nelson, alone and single handed at his own expense, carried the question up to the supreme court which decided against him although the lower court decided in his favor. It seems likely that the people will become tired of the enforcement of the law before it has been long in operation. On December 27 Mr. Nelson had the extreme pleasure of paying fines of \$50 and costs in each of three cases, and was granted a continuance in three other cases until next term of court. Mr. Nelson believed he had complied with the law, as he understood it, before



S. L. NELSON'S NEW VESTIBULE.

it went into effect, with the exception of a "wrecking car," which it was more convenient to operate without a vestibule. He makes the statement that, with the possible exception of Columbus, the law is being violated in every city of the state.

The law was adopted "to protect the motorman from the wind and storm," while a compliance with the specifications submitted to the street railways would make it absolutely necessary for the motorman to stop his car, hunt up his key, unlock the door and then wade around through slush or mud in order to throw a switch or put on his trolley. All this takes time, and the passengers must wait patiently until it is accomplished, for the law apparently requires the street railway systems of the state of Ohio to be run for the sole benefit of the motorman, and not for the convenience of the public.

The entire platform must be covered by the vestibule,

according to the construction placed upon the law by the authorities, which means both platforms on most of the cars. The enforcement of the letter of the law will prevent the easy and rapid entrance and exit of passengers, while if the motorman becomes too warm and wants to cool off, he dare not open the window, or he is liable to arrest and place the company in position to be fined. The illustration shows the vestibule designed by Mr. Nelson and placed upon the Springfield Railway Company's cars.

Mr. Nelson is an ornament to the street railway fraternity, and especially to that of the state of Ohio. He is the only manager who had the courage and inclination to spend his money fighting for the interests of the street railways of Ohio. Yet, when he won the fight in the lower court, they were all congratulating themselves that the obnoxious law was of non-effect. It would be a good thing if there were more Nelsons among the street railway men, for then there would be less legislation designed to curtail the rights of street railway companies.

HOW TIM MULLIGAN BECAME A DYNAMO.

Hillo Casey, is that you or your brother? Shure, I niver know which is t'other unless I see yez together. An' why wasn't ye oop at Tim Mulligan's wake lasht Friday night? Shure, 'twas an illigant toime, indade, that we had. Did ye not hear of it? Arrah, look at that now. Well, set ye down and I'll tell ye all about it.

Ye knew Tim Mulligan, did ye not? Him that was tarring the schmoke schtack out there at the illictrick power house. A little script-up, bald-headed bit of a man. The same. Well, ye see, Tim had cauld in his jaws, and he thought as how he'd warrum up with a poipe, and what does the dom fule do but shlap his dudeen up agin a dynamo to catch one of thim sparks he see joompin' about.

Be gob, he got a sparrk about tin feet long into him an' it knocked him clane across the shop an' thru a windy. Well, sor, Tim was that full of thim illictricks that they had to handle him with roober gloves, and when Mrs. Mulligan raised the keen and threwed herself on him she wint awver on her back as though Tim had hit her wid a brick. Whin Father Doosey was tould of it he gave a twhist to his mout', and he says, says he: "That's the first toime on record, I giss, that a woman got shparrking wid a carrpse," says he.

Mr. Mulvaney, the ondertaker, laid him out, and they had to sthand him on two glass plates, wan under aich fut, and put the roober gloves on him, too, afore he cud tich him. When the Widdy O'Connell heerd of it—her that's been creppled with the rhoomatiz these foive years—she wanted as she shud be carried awver, so as she cud tich the carrpse's hand to see if it wouldn't shock the steffness out of her, but Mrs. Mulligan said she have no battery gaames with her lost darlint, and so they carrud the Widdy O'Connell back agin, shwearin' like a trooper.

Friday avening after wurrk, Jim Brady druv awver from the power house with an illigant videe and his shpring waggin, and whin he hitched up he tuk Terrence McMurthroyd an' me on one soide an' he says, says he, "Luk'ere, byes. What d'ye say in making this an illictric waake?" says he. "How's thot?" says I. "Why," says he, "Tim's thot full of them illictricks that ef we wos to connict him with these 'ere incandaycint lampsh that I've brot awver he'd jist sit thim all a blaszen an' we'd hav the foinest wake in New Yarrk." "Be gob it's a graate idee," I says, says I, "but I'm doubtin' ef the Widdy Mulligan will 'low it." "Well," says Brady, says he, "you taake the widdy into the kitchen to luk at the color of that (it was a bottle, Casey) an' I'll fex Tim up for a dynamo in a twenking, an' whin we turns on the connection, sure it's the widdy will tink it's the foinest carrpse light that iver wos."

So I got the widdy out of the waay and Brady fixed the lamps four of thim, weth two wires to Tim's two fosteses and wan to aich fut.

Then, whin all the mourners wos there and the widdy was raisin', Brady tiched a button and the four incandaycints spitted and sputtered and thin blazed up. The widdy gave a shriek. "Shure his sowl's in glory," cries she, and all the rist of them cried the same.

Fayth there was a graate toime for the next tin minnits, and thin the lamp she gave another shpitt an shputter and thin wint out, laving us in darkness. Thin there wos more screaming, and thin there wos quiet, as the wimmin flopped down fainting wan after t'other, and thin we heard Tim Mulligan say:

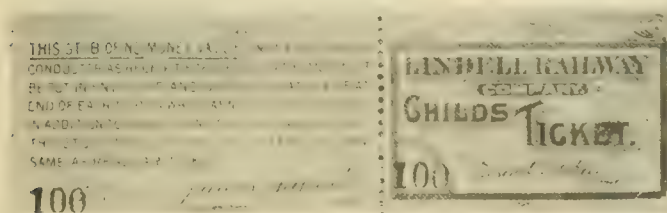
"Bad cess to the man that hit me. Wheer's me poipe?"

Somebody shtruck a match, an' theer we see Tim Mulligan down on the flure, sarching for his poipe, and the four wires all tangling up around his hands and fate. Brady wheps out his pliers and cuts the wires quick as winkin', and then we got a lamp, and a nice illigant toime we had of it straightenen tings out for the next tin minnits. But when Brady showed us how the illictricks had all got burned out of Tim's body, and that he was as good as new and a dom sight better, we'd loike to have raised the rufe, an' divil a wan of us wint to bed shober thot noight—not even the carrpse.—New York Sun.

Stanley Green, western manager of the Fuel Economizer Company, Matteawan, N. Y., with headquarters at 574 Rookery, Chicago, has sold Russell B. Harrison, Terre Haute, Ind., 800-horse-power of Green's fuel economizers. Mr. Harrison will sell his exhaust steam to outside parties and at the same time will heat his water to over 212 degrees by the use of the new apparatus. Mr. Green sold him two economizers of 750-horse-power a year ago, which have done such good work that the second order naturally followed. Mr. Harrison is demonstrating his ability to the world as a progressive street railway manager, and has a model street railway. The new power house he is building will be a most economical one, which will undoubtedly give many valuable pointers to the fraternity.

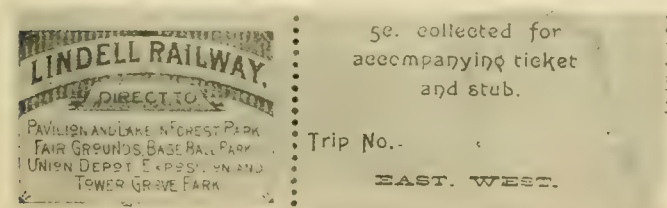
NEAT WAY OF HANDLING CHILDREN'S FARES.

As has been mentioned before in these columns, the question of handling children's half-fares is always a perplexing one, and as for a satisfactory method—well, it can very truly be said that there has been none. The plan adopted by the Lindell Railway, of St. Louis,



NEW FORM OF CHILD'S TICKET.

recently, comes the nearest to a solution of the problem of any that have yet appeared. Conductors are issued children's ticket books containing 100 children's tickets, and on receipt of these books have \$5 charged to their account. When a conductor receives a child's fare he takes the full five cents, and, tearing a child's ticket off the stub in his book, gives it to the child in change. The stub from which the ticket was torn he tears out, and turns in to the office, with the trip on which it was taken



NEW FORM OF CHILD'S TICKET.

entered on the back. Our engravings show both sides of the ticket and stub.

When a conductor gives such child's ticket in change he, of course, rings up the cash received as a full fare. When the child's ticket is taken in by a conductor it is rung up as a fare, entered on his trip sheet, and turned in. Each book of tickets is numbered, and every ticket and stub in the book bears that number. There is no ringing up of half-fares as full fares and depending on the conductor's honesty not to enter half-fares as full fares. In giving change for a half-fare a conductor must tear out a ticket, and if the ticket is gone he must account for it in cash. When a half-fare ticket is received the conductor has it to present, so that he can not be held liable for a cash fare. The cover to the ticket book contains explicit instructions to conductors as to the management of half-fares. This book and method is the invention of James Adkins, treasurer, and George W. Baumhoff, superintendent of the Lindell Railway, St. Louis, and a patent has been applied for.

ANOTHER OHIO INTERURBAN.

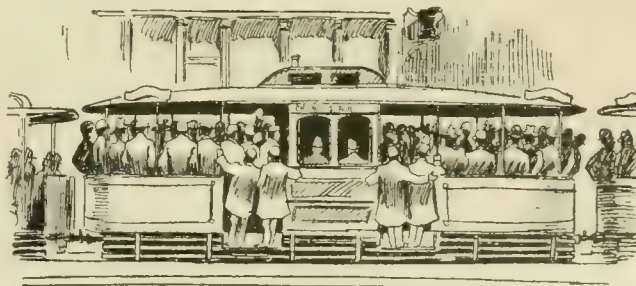
The Cincinnati, Hamilton, Middletown & Dayton Street Railroad Company is about to construct a long interurban electric railway in the southwestern corner of the state of Ohio. The line will extend north from Cincinnati sixty miles through the counties of Hamilton and Butler, across one corner of Warren and into Montgomery county, where Dayton will be the terminus. On the route are the towns and villages of Avondale, Bond Hill, Carthage, Hartwell, Wyoming, Lockland, Reading, Glendale, Springdale, Hamilton, Middletown, Franklin and Dayton. These towns are now giving a heavy traffic to the steam road of the Cincinnati, Hamilton & Dayton Railroad Company, and the new electric road will probably be a paying enterprise from the start.

The capital of \$500,000 has been subscribed by General Andrew Hickenlooper, president of the Cincinnati Gas Company; Charles Fleischman, president of the Fleischman Distilleries & Yeast Company; Colonel L. C. Weir, president of the Adams Express Company; H. H. Hoffman, tobacconist; Henry B. Moorehead, capitalist; O. C. Barber, president of the Barber Match Company, and O. B. Brown, of the Dayton Traction Company. The Cincinnati Street Railway Company is also interested.

The officers of the company are L. C. Weir, president; A. Hickenlooper, vice-president; O. B. Brown, secretary; W. A. Goodman, treasurer, and H. B. Moorehead, general manager.

A NEWSPAPER ARTIST'S SUGGESTION.

Artists who make a specialty of cartoons, often strike their admirers with ideas that are amusing, chiefly on account of being so absurd. The street railway system gives them ample opportunity for exercise in times of dullness, and it is a favorite field for loosening up the imagination. The cartoon presented to our readers is from the Chicago Record. It represents the style of car the artist thinks ought to be used during the rush hours,



and shows the car loaded to its capacity. It is difficult to understand why he permits so much waste room in the center of the car, for it appears as if there was room only for four passengers, and to be reserved for ladies. There should be at least room for twice as many people on the inside, according to the space allotted, but perhaps the fair passengers wear the non-collapsible sleeves, which accounts for the large amount of room they seem to require.



SKATING POND—PATERSON RAILWAY COMPANY, PATERSON, N. J.

SKATING RINKS AS REVENUE PRODUCERS.

PART II.

It is such a simple matter to operate a skating rink, that it is not appreciated as it ought to be for its real value. M. R. McAdoo, manager of the Paterson Railway Company, Paterson, N. J., writes that his company expects to get from \$3,000 to \$4,000 extra each month from its skating pond above the ordinary revenue. The most expense of running a pond will be to keep the ice clear of snow, which accumulates from the cutting of the skates into the ice. But two men are all that are needed, except when there is a large fall of snow. If a scraper is required, the younger male element of the skaters will enjoy pulling it up and down, thus doing the hardest work, which is play to them. The men employed to keep the ice clean need be only common laborers, so that the cost of this service can be closely estimated according to the prevailing local rate.

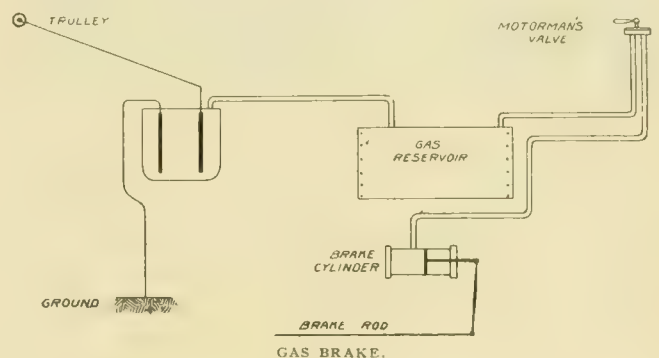
The house for skaters, if an old car is not available, can be roughly put together, not even requiring paint. The furnishings need be only common benches without backs, arranged along the sides of the rooms, of which there should be two, one for ladies and the other for gentlemen. Two cheap stoves ought to be supplied, which should not burn more than ten tons of coal in the season, and two buckets with tin cups for drinking water, complete the furnishings. In some localities it might pay to put in a stock of skates to be rented. If there are enough people to patronize a venture of this kind, a pair of skates will pay for itself in two or three days.

The illustration shows the pond of the Paterson Railway Company, which is considered a valuable piece of property by its owners. The flooding apparatus, which is not shown, consists of a chute connecting another pond, the flow of water being regulated by a gate. The ice does not require flooding frequently, and then only enough water is allowed to flow to procure a new and clean surface; the less water is put on, the quicker the ice will be in condition. Out of door skating will draw more people than indoor skating, for there is an exhilaration out of doors which is lacking inside, and compels people to go again.

During holiday week the Paterson Railway Company earned on each of two days \$325, and on the other five days an average of \$200 a day. At night the pond is lighted by means of arc lights, which is an additional attraction. Paterson people are very fond of skating, and the company is taxed to its capacity when the ponds are in shape to accommodate them. The same result will follow in other localities, if an effort is made to supply the demand.

A GAS BRAKE.

An electrical engineer who paid us a visit the other day revealed a wonderful idea in the way of a car-brake that he has considerably refrained from patenting. It is free to all comers; in fact, will be given to anybody that will take it away. An air-tight electrolytic bath is placed under the car seats, and the current from the trolley passes through this, generating gas, which is kept in



the storage tank or auxiliary reservoir. From there it is turned into the brake cylinder, as in a plain air-brake. True, it would probably take enough energy to run several cars to generate gas enough to brake one, but that would make little difference. The idea is too valuable to be upset by any little considerations of that kind. It would also be an excellent thing to blow up a car with, if occasion seemed to require it.

P. F. Sullivan, acting manager of the Lowell, Mass., Electric Railway, has been appointed general manager, in place of John Fisher.

JAPANESE STREET RAILWAY.

Our esteemed friend, W. Araki, as he now calls himself, having succeeded to the business of Y. Araki & Co., of which he was manager, and, according to the customs in Japan, has changed his name to that of his predecessors, has sent us a most interesting letter from Osaka, Japan, accompanied by a Japanese magazine, describing the festival in honor of the celebration of the silver wedding of the emperor and empress. The magazine has twenty pages illustrated with half tone pictures of the emperor and empress, and incidents of the celebration, the most remarkable being what would be called in America, a wash drawing of a banquet hall containing thirty-one portraits and the table with all its decorations, the details being brought out in a marvelous manner. The type was all made in Japan, and the book is the production of the foremost job printers of Tokio.

We have endeavored to reproduce one of the engravings from the magazine, but the result is not as good as we would like, on account of the porous quality of the Japanese paper, which has absorbed so much ink that the details do not come up well. The photograph was taken March 9, 1894, silver wedding day, and is a scene at Kirokoji, leading up Ueno Park, Tokio. It is a double track horse railway, connecting all the principal places in Tokio. Tickets are sold on the cars for two sen, equivalent to one and three-fifths cents, for each section

of the city, which is divided into north, east, south and west. If a passenger wishes to ride through the north side, for instance, he must pay two sen, but for half the distance only one sen is required. The two-wheeled buggies, drawn by men, are jinrikshas, which is the chief mode of conveyance for long as well as short distances, the runners having wonderful

endurance and speed, covering, it is said, as many as seventy-five miles a day. Thus we see the old and the new, side by side.

There is now building in Kyoto, (first rank in her grandeur and beauty, and third cardinal city in the empire) a street railway which will be open to traffic in April, when the State Industrial Fair is dedicated. Our friend has promised us a description, with some photographs taken by himself. That he is an artist, is shown by the view of the vase shown herewith, containing a dwarf pine tree one and one-half feet high, which has obtained its growth. He remarks that the cost of living is so cheap in Japan that "even the foreigners can afford to live at about two Japanese yen, a day, which corresponds about one U. S. dollar, that is, 'well-to-do'



JAPANESE DWARF PINE FULL GROWN.

household." We desire to acknowledge our gratitude to our friend, W. Araki, for his kindness in sending us such an interesting letter and magazine.

The officers of the Galveston, Tex., City Railroad, have come out with flying colors in the examination of books and affairs ordered by the stockholders.



MODERN AND ANCIENT VEHICULAR TRAVEL—JAPAN.

ANNUAL REPORT OF THE CHICAGO CITY RAILWAY.

The Chicago City Railway stockholders met January 15 to listen to the record of another year of successful operation. Like every other street railway in the country it felt the effect of the off year. In addition to this, the World's Fair traffic of 1893 swelled the earnings of that year so as to make the contrast with last year even more marked than with other roads. Nevertheless, the showing would do credit to any road, and reveals an efficiency of management which it is hard to excel. Superintendent Bowen is surrounded by able heads of departments, and the system of administration is one of the best in the country. Because of 1893 being an extraordinary year comparison is made with 1892.

Passenger earnings were \$4,239,749 and miscellaneous receipts \$24,869, making the total earnings \$4,264,618. The cost of operating, including insurance and taxes, was \$2,838,684, or 66.56 per cent of the earnings. This is 2.72 per cent above 1892. The interest on bonds was \$207,877, so that the total expenditure was \$3,046,561, making the net earnings \$1,218,056, or 13.53 per cent on the capital. The dividends paid were 12 per cent, or \$1,080,000, leaving a surplus of \$138,056. The cable lines carried 64.5 per cent of the passengers, the electric lines 11.22 per cent, and the horse lines 24.28 per cent. The car mileage of the cable lines was 15,231,400, that of the horse lines 3,965,750 and the electric 1,850,260.

The cost of operating per car mile was:

Cable lines.....	\$.0997
Horse "2539
Electric lines.....	.1690
Average of all.....	.1349

Granite block paving was laid to the amount of 65,767 square yards, cedar block 2,630, and Purington brick 11,320. This is interesting as showing the tendency of the times toward brick paving. In July, ordinances were passed authorizing a change from horse to electricity of eighty-two miles of single track. In 1894, 19.32 miles were operated electrically and 27.97 miles were ready in January, 1895, leaving 34.75 miles to be completed later. Since July 47.29 miles were changed to electricity. The company has now 547 box trailers, 647 open trailers, 320 grip cars, 193 box motors and 25 open motors. Forty-nine double motor equipments are yet to be put in service. These will be put under rebuilt horse cars. The same directors and officers were elected for 1895 that served last year.

CHICAGO GENERAL RAILWAY REPORT.

The Chicago General Railway held its annual meeting at its new plant at Kedzie avenue and Thirty-first street, January 14, and the report of Vice-President C. L. Bonney showed that although the road has been operating but a few cars and with but a temporary plant, a very good record had been made as to car mile expense. The total cost of operating the road, including the inter-

est on the bonds issued, was 14.41 cents per car mile. These bonds included not only those necessary to build the road already operated, but those issued for additional road and equipment. The actual operating expenses, not including fixed charges, were about two cents less than the figure named. From five to seven cars were operated. The new equipment which will be used after this consists of single truck vestibuled motor cars, with electric brakes, and double truck vestibuled trailers, forty feet over all, to be equipped with electric brakes.

ANNUAL REPORT OF THE NATIONAL RAILWAY LINES, ST. LOUIS.

The five roads which make up the National Railway Company's system at St. Louis have always made good records as to economy of operation and the past year, so discouraging to most companies, has proved no exception. The gross receipts for 1894 were \$1,353,136, and the operating expenses \$776,581, so that the net earnings were \$238,869.

Car miles.....	11,446,890
Cable car miles.....	7,818,912
Electric car miles.....	3,627,978
Passengers.....	27,006,635
Car mile operating expense (electric).....	\$.0808
" " " " (cable).....	.0704

The operating expenses of the cable lines were 57.17 per cent of the receipts, and for the electric 57.77 per cent of the receipts.

The wages are about the same as those paid in Chicago with the exception of the Chicago City Railway, which pays the highest wages of any company in the country. In spite of this the operating expenses are only about two-thirds of those of similar Chicago lines. We congratulate the officers of the consolidation on their efficiency.

TRAMWAYS OF GREAT BRITAIN.

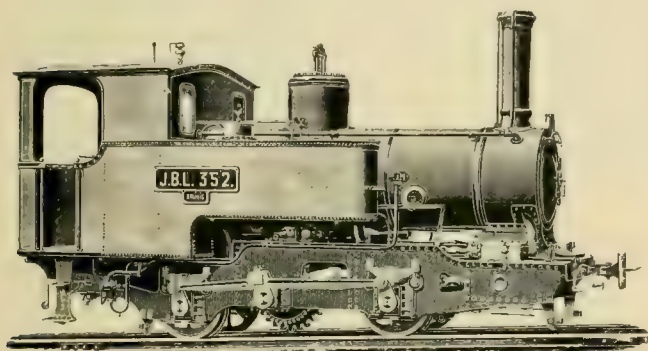
Official returns show that there are 975 miles of tramways in Great Britain, an increase of 15 miles during the year. The capital represented is about \$70,000,000, an increase of about \$7,500,000. Passengers were carried to the number of 616,792,830, an increase of 17,683,321. The lines earned about \$15,000,000 gross, at an expense of \$10,000,000, or 79 per cent, leaving about \$3,500,000 net receipts. As compared with the previous year there is an increase of \$45,000 in gross receipts, with an increase of \$100,000 in expenses so that net receipts are about \$5,500 lower. In working these 975 miles of road there were employed 30,528 horses, 564 locomotives and 4,179 cars.

Playing Cards.

You can obtain a pack of best quality playing cards by sending fifteen cents in postage to P. S. Eustis, Gen'l Pass. Agent, C. B. & Q. R. R., Chicago, Ill.

SWISS MOUNTAIN ROAD.

Not many years ago travelers to the beautiful lakes of Switzerland and the glorious Alps were fond of telling their less fortunate fellows of the toilsome ascent, many narrow escapes and the necessity of being tied to a guide by a rope to prevent a fall over a precipice with the prospect of landing on the ice and rocks of a slow mov-



COMPOUND ADHESION AND RACK ENGINE.

ing glacier thousands of feet below. The travelers of the present day have missed all of the thrill of adventure, for now it is au fait to climb the Alps in a railroad car, avoiding all sharp stones, adventures that have a tendency to turn the hair white, the pleasant sensation of being lost in the snow and having a big St. Bernard dog ask you to take a drink, and escaping all the fatigue and exposure that until recently accompanied the ascent of the Alps.

C. S. Du Riche Preller has made a study of mountain roads, especially strategic roads, and his conclusions in regard to cable and electricity as a motive power were published in the January REVIEW. This month we print a description of the Brunig Pass Railway, Switzerland, giving credit to Engineering, London, from which we reproduce the illustrations. The railway connects the beautiful town and lake of Lucerne with the lake of Brienz and the Bernese Oberland by crossing the Brunig Pass or divide of the water sheds of the rivers Reuss and Aare. The road was built on the adhesion and rack principle, by the Jura-Simplon Railway Company, which operates the Southwestern and French Swiss systems of railways. The road 36.4 miles long is composed of three sections metre gage, two being flat, and the other a mountain section. The greatest rise is 1693 feet which is overcome by three rack sections of nine, nine and ten per cent, and two intermediate adhesion sections, having grades of 2.5 and 1.5 per cent. The greatest fall is 1332 feet, by descending a steep declivity in an oblique direction with a continuous rack section 2.5 miles with a maximum gradient of 12 per cent. The adhesion sections of the whole line amount to 30.7 miles, while the total rack sections are only 5.7 miles. Riggenbach's ladder type of rack is used, weighing 157.4 pounds to the yard, and ordinary Vignoles rails of 48.5 pounds weight to the yard were laid on metallic sleepers each weighing 82.2 pounds. The road cost about \$2,600,000, or \$46,750 a mile.

An adhesion engine weighing twenty-five tons when

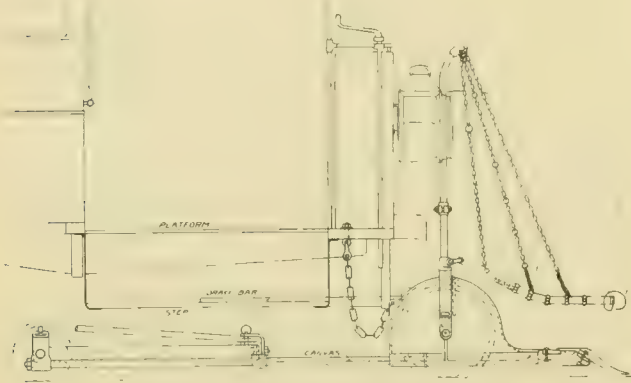
full is used on valley sections, and a compound adhesion and rack engine, weighing twenty-three tons when full is used on mountain sections, the boilers being inclined so as to be horizontal on a 12 per cent grade. The traction power of adhesion engines is 3.5 tons and they develop 400-horse-power. The adhesion and rack engines have tractive power of eight tons and develop 480-horse-power. The weight of passenger cars is 7.5 tons empty and about ten tons with thirty-six passengers, while goods trucks and vans is 4.5 to 7.5 tons empty and eight and ten tons filled. The average load of passenger trains on valley sections, exclusive of engine, is 100 tons, and that of goods trains 130 tons. On mountain sections passenger trains are usually divided and consist of four passenger carriages with mail and luggage vans, weighing 50 tons without the engine. On valley sections the speed developed is twenty-seven miles an hour on 1.5 per cent grade, on adhesion mountain sections 12.5 miles an hour with 2 per cent grade, and on rack mountain sections 8 miles with 10.5 per cent grade. The line is worked all the year except from December to March, when the mountain section is closed because there is no passenger traffic. The line carries about 310,000 passengers every year, and runs about 138,000 train miles. The cost of operation per train mile is about as follows: maintenance 12.54 cents; locomotive power, 29.08 cents; traffic, 16.84 cents; administration, 3.06 cents; sundries, 3.68 cents; total 64.90 cents. The illustrations show a compound adhesion and rack engine and a view of the line near the summit cutting, with the Alps of the Bernese Oberland beyond.



ALPS OF THE BERNESE OBERLAND

FULTON CAR FENDER.

Among the latest fenders is one that has the peculiarity of having a truck of its own, and is put on the market as the Fulton car fender. A side view is shown in this connection, giving an idea how the fender, which is double, is attached to the car. The pick-up part gives a surface five feet six inches long, and it is said will act as well upon a person lying head or feet to the car as if the



FULTON CAR FENDER.

body be at right angles to the track. The buffer or upper fender is designed to pick up or catch persons struck by the car while running or walking across the track. Both fenders are in line, the lower fender being capable of adjustment so it will work within one-half inch of the track if desired. Being on its own truck, and connected with the car body only by the push rod at the back of the fender, the latter is said to be absolutely unaffected by the oscillation of the car body, but to perfectly protect the track even around curves. The lower pick-up spring projects only three inches over the track even on sharp curves, which is not as much as journal boxes on some trucks. The top fender can be folded up to the dasher, so that cars can come bumper to bumper in the barn, or on the line where necessity compels one car to push another. It is claimed that the Fulton fender is the only one that protects the car from top of dasher to top of rail. An additional advantage of the independent structure is said to be that it does not have to be made to conform to the shape of any particular car, and that only one-fourth the usual number of fenders need be purchased to equip a road, as one can be used at either end of a summer or an enclosed car. Joseph T. Skerrett, 3940 Spruce street, Philadelphia, is handling the Fulton fender. He is a practical street railway man, having been manager of the Brigantine Transit Company, Brigantine Beach, N. J.

The motherly looking old lady frantically waved her green cotton umbrella at the fast receding car. Someone notified the conductor, who stopped the car. Rushing up to the steps, as the conductor bent over to help her, she grasped his arm and gasped: "Conductor,—oh, conductor—i—is there anyone on the car asking for me?" And the car moved on.

SUPPLIES FOR ALL ELECTRIC SYSTEMS.

Business in the street railway supply line has been steadily improving for a month, and the outlook is encouraging. The outlook is bright for all kinds of supplies and for all branches of the trade. It is particularly satisfactory to the Simonds Manufacturing Company, Pittsburg, which for thirty months has been building a reputation that has secured it a prominent place among supply concerns. Many of the leading roads are using its supplies, having found them uniformly of good quality as represented.

This company has been quite successful during its comparatively short life. W. A. Simonds is president and treasurer, and John Jackson, secretary and superintendent. The factory is at the corner of Smallman and Thirty-second streets. The company's specialties are gears, pinions, trolley wheels, bearings, harps, etc., suitable for all systems. The Simonds Manufacturing Company manufactures malleable and brass trolley harps of special design, with contact springs. They have taken quite well with the trade at large, and considerable business is done in them, for a trial convinces users of their merit. This device is going through the process of being patented. The company has facilities for making prompt shipments, so there is no delay in filling orders, although a large business is done. There is enough stock constantly on hand, and the factory is capable of considerable output each day, so that orders are promptly filled and shipped out.

HAVE FUN WITH TRAINMEN.

All cable trains of the North Chicago Street Railroad pass through a tunnel which is three hundred yards long. In the tunnel is a parallel passage for pedestrians. This passage is separated from the tracks by a brick wall, with many arches. These arches are closed by wire screens, which, while they keep out intruders, do not shut out sound. While a heavily loaded train was passing down the incline in the tunnel, one night, all the passengers were startled by a piercing shriek. A second and a third shriek followed, and then shouts of "Stop the car! Stop, quick!" came from the men on the platforms. The brakes were applied, but the horrible groans continued to come from the side of the car next the wall, where it was supposed some unfortunate was being crushed to death. Finally, the train stopped. Conductors and passengers swarmed over and around the cars, looking for the remains. Just as the conductor crawled on his stomach, under the car, a peal of jeering laughter rang through the tunnel, and half a dozen young rascals scampered away as fast as their legs could carry them. The conductors were too mad to swear. The gripman suspected the trick at first, but said: "I had to stop. What if some one had fallen under the car. I can't take chances."

An electric road of forty cars will probably go in at Puebla, 100 miles from the City of Mexico.



MOTOR CAR METROPOLITAN WEST SIDE ELEVATED RAILROAD, CHICAGO

METROPOLITAN ELEVATED CARS FOR CHICAGO.

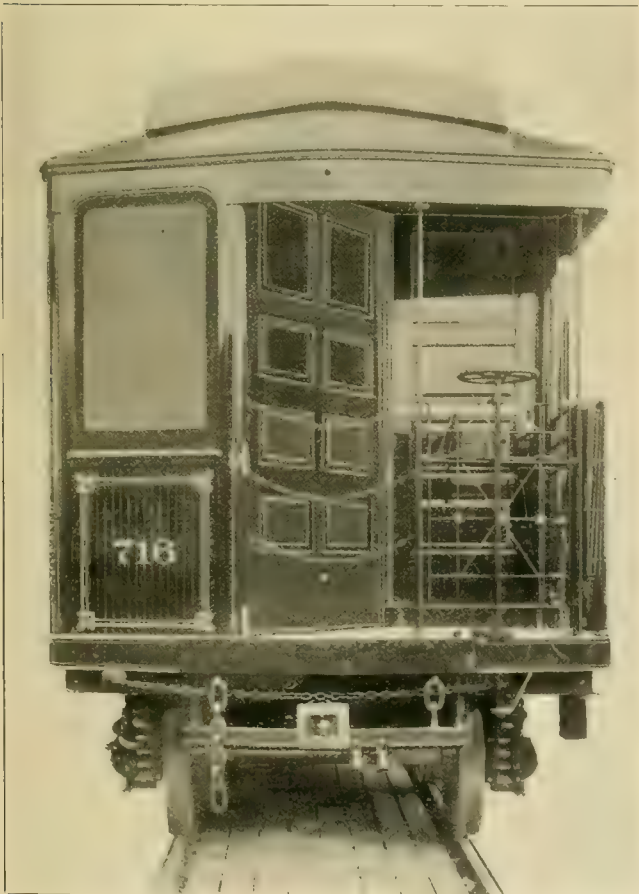
The accompanying engravings are from photographs of the motor cars which have been made by the Barney & Smith Car Company, for the Metropolitan West Side Elevated Railroad, of Chicago. The diagram also shows the floor plan. The cars are 40 feet over the sills and 47 feet $2\frac{3}{4}$ inches over the platforms. The motor cars have nothing but side seats. The trailers will have both side and cross seats, as other elevated cars.

The motorman has a cab in each corner, and the passenger entrance to the car is through a sliding door at the side of the cab. For the present, the motor cars will



FLOOR PLAN OF MOTOR CAR.

be equipped with two 100-horse-power motors, and will haul two trailers. As the traffic increases two more motors will be put on each motor car, so that longer



END VIEW OF MOTOR CAR



INTERIOR OF MOTOR CAR

trains can be handled. Trains will have electric lights and electric heaters, and will undoubtedly be the finest elevated trains in the world. Barney & Smith are to be congratulated on the important part they have taken in the work. The first equipment will be of fifty-five motor cars. There is a prospect now that the road will be operated early in the spring.

IN AN AWKWARD FIX.

It is astonishing what foolish things men will do. This point is illustrated in innumerable ways, but occasionally forces itself upon the public, when an attempt is made to put into practice the theoretical legislative enactments in favor of the "workingman." In New York State the street railway companies and the municipalities have struck a snag, which prevents at least one company from carrying out the provisions of its franchise, and makes it impossible to build substantial street pavements. While the complication is serious, it is laughable.

President A. R. Hart of the Long Island Electric Railway Company discovered in looking over his company's franchise that it required a Belgian block pavement to be laid on each side of the tracks. This seemed simple enough, but the company's attorney found a statute in force which was apparently forgotten, or unknown, that would make it necessary for President Hart to engage in the monumental business, which did not promise to be profitable, as the community is healthy. The law which has proved a boomerang, was enacted for the benefit of the "workingman," and requires that all stone used in public highways must be cut and dressed on the ground where laid. Foreseeing that second-hand blocks might be used and thus defeat the spirit of the statute, a clause was inserted prohibiting the use of anything but new stone on public highways. The result has been that no stone pavement is being laid in the state, because it is too expensive to pay freight on a whole quarry, and then on the refuse cuttings back to a place where there is a market for them, especially as the monument business is not particularly active. As President Hart does not care to place in jeopardy the franchise of the Long Island Electric Railway Company by adding a monumental department, he has applied for permission to substitute cobble stones for paving block, as they require no dressing.

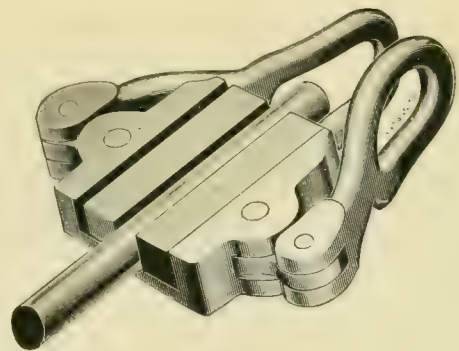
Eastern parties have obtained control of the City Electric Railway Company, Rome, Ga., which now has the following officers: Seymour Cunningham, Washington, D. C., president; Joseph B. Marion, general manager and treasurer; E. M. Greene, superintendent and electrician. The company has twelve electric motor cars, and will begin to run two additional cars in about three weeks, when its turnouts are completed. The company furnishes power to the Rome Electric Light Company, and the two companies will probably be consolidated.

STREET CARS ON SLEIGH RUNNERS.

Two cars have been mounted on runners by the Rome City Street Railway Company, of Rome, N. Y., for use when the track is badly obstructed with snow and ice, and until it is considered advisable to properly remove it. Each car will accommodate fifteen passengers. A stove is furnished for heating, and the seats are upholstered. The runners are placed five feet apart, guaranteeing perfect safety from overturning. With good sleighing it is easily handled by a pair of stout horses when loaded to full capacity. The cars are an economy to the company in track cleaning, and a source of pleasure to the public. Converting street cars into sleighs is not a new idea. In Montreal, before the days of electric traction, the placing of cars on runners was a common expedient. The long and cold Canadian winter furnished the conditions necessitating a resort to other than wheel traction.

T.-B. COME-ALONG.

Come-alongs, to be of any value, should have a tight grip, so that no matter how great a strain is put upon them, they will not slip. The T.-B. come-along, illustrated in this connection, is said by those placing it upon the market to embody all requirements of electric railway construction. For instance, it will grip any wire used in railway work, and when once applied to the wire will never slip, they say, until the strain has been taken



T.-B. COME-ALONG.

off, causing it to drop from the wire. When put on a straight piece of wire, blocks can be attached to it without deflecting the wire. The rings are large enough to admit two hooks, thus making it convenient to use two sets of blocks, which will be appreciated in the hauling of heavy wires. The device is placed on the market by the Thompson-Brown Electric Company, Boston, which says it is strongly constructed and is warranted not to injure the wire.

The Bridgeport Traction Company hitched one of its motor cars to a peculiar load, not long ago. A 21-ton generator was hauled by horses to a point on the trolley lines and there a motor car heavily weighted down was attached and the truck hauled the rest of the way to the power house.

EMPLOYEES' READING ROOM

PART II.

It is surprising how little money is needed to fit up a suitable room for employes. A partition enclosing a corner of the barn makes a room, which can be papered to look attractive and homelike, and will make a fine reading room. The furniture need not be expensive, yet will answer every purpose, as has been demonstrated by H. P. Wilbor, general manager of the Erie Electric Motor Company, Erie, Pa. He was handicapped in the start, as probably most roads are, because the buildings were never built with any such object in view.

"I managed to make a room sixteen feet square," says he. "Around the sides I put a shelf of 1½-inch pine, 2 feet wide, and 2 feet 8 inches from the floor, with a slight pitch. I made some stools with iron legs and wooden seats, which are bolted to the floor around the tables. The expense of fitting up a room will vary largely with a person's taste and the extent to which he wishes to go. We keep Harper's Weekly, Puck, Judge, Youth's Companion, Golden Days, etc., which are bound in covers made for the purpose, with the name of the magazine stamped on the outside. We have no library. One man is appointed each week to look after the room, but I notice all of the men make it a point to see that it is kept in shape. I am not aware that a paper has ever been mutilated or torn. We are fitting up a room 60 feet by 30 feet in the second story of our building, which will be equipped as a gymnasium, and have two bath rooms."

W. F. Kelly, general superintendent of the Columbus Street Railway Company, Columbus, O., writes:

"We have on our office floor a well lighted room, about 20 feet by 24 feet, formerly used as a directors' room, which we have furnished as an employes' reading room. The floor is covered with linoleum, comfortable cane seated chairs are provided, and a table 14 feet long is supplied with Century, Harper's Weekly, Harper's Monthly, Scribner's, Forum, Lippincotts, Review of Reviews, Outing, Munsey, Cosmopolitan, Life's Calendar, Frank Leslie's Monthly, Frank Leslie's Weekly, Illustrated American, STREET RAILWAY REVIEW, Street Railway Journal, Street Railway Gazette, Engineering Magazine, Power, Electrical World, and Electrical Engineer.

"The room and reading material are furnished by the company, and is free to all employes of the road, including those from the shops and power station. It is open evenings until ten o'clock, and also Sundays. We believe the best treatment possible is none too good for our men, and we feel that our efforts in this line are appreciated by them.

"They have a beneficial organization which pays a weekly benefit to sick and disabled members. We have given them some assistance in this matter, and furnish them a meeting room warmed and lighted. We also intend making them a donation every six months of a sum equal to 10 per cent of the amount in their treasury."

COME TO STUDY T RAIL CONSTRUCTION.

Terre Haute, Ind., and its electric street railway, draw many visitors to study T rail construction, as it is exemplified on Russell B. Harrison's road. Scarcely a week passes without a delegation of city fathers and street railway men, who "come to scoff, but remain to pray." Mr. Harrison royally entertains all who come, being very glad to be of service to street railway men. His road is certainly a model of excellence, aside from its track construction, and visitors always find new features tending to economical operation. Among the recent delegations were representatives of the city councils of Michigan City and Hammond, Ind., who were prejudiced against T rail construction, but after inspecting the excellent roadbed, expressed themselves as being strongly in favor of permitting its use in their cities.

WOMEN CAR CONDUCTORS.

Not in the United States nor in Canada is the gentler sex employed in ringing up fares, but in Spain they are working on street railways as conductors, at road repairing and coal-ing steamers. Senorita Gili-Matas, whose portrait is in this paragraph, is one of the conductors employed by the Calle-Car Compania, or Barcelona Street Car Company, Barcelona, Spain, which we are permitted to reproduce through courtesy of J. Moris, managing director of the company. The women are not permitted to converse with passengers, and any passenger who makes an effort to engage one in a prologued talk is placed under arrest. During the war between Chile and Peru in 1878, women were employed as conductors on Chilean lines, on account of the scarcity of men who were conscripted in large numbers. The woman whose portrait appears in this connection is said to belong to a family once wealthy, but reverses have forced her to earn her living in this manner.

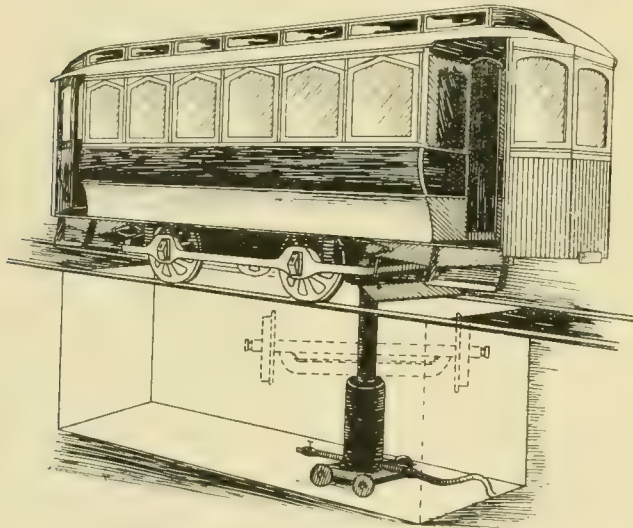


SPANISH CONDUCTOR.

WHAT STREET RAILWAYS CAN LEARN FROM STEAM RAILROADS.

PART II.

Removing wheels from car trucks is a tedious and expensive operation in the majority of street railway shops. Perhaps it would be a good plan to step over and see how our steam road brethren do it. It will soon be found that here is another thing that street railways can learn from steam roads. The plan used in steam road shops for removing wheels from trucks was put in use in the South Chicago City Railway shop several months ago by R. D. Rowe, formerly superintendent, and Mr. Corbett, formerly electrician of that company. It involves the use of a hydraulic or pneumatic jack and a short section of removable rail at that point of the pit at which it is desired to take out the wheels. In operation the plan is simply as follows: The car is run over the pit which has the sectioned track and the hydraulic jack is placed under the axle to be removed. The jack then lifts the



METHOD OF REMOVING WHEELS FROM CAR TRUCKS.

wheels clear of the track. Blocks are put under the truck frame, the sectioned rails are taken out and the jack is lowered enough to allow the axle to clear the truck. The axle is then swung around a quarter of a turn so that it is parallel with the tracks, and being between them can be lowered into the pit without further obstruction. The hydraulic jack is of course on a small truck of its own so that it can be run around the pit. The jack has an arm, the ends of which are shaped to receive the car axle. The fire pressure which is kept at 100 pounds over the building is used to work the hydraulic jacks. Compressed air is used for this in many railroad shops. Compressed air has the advantage of never freezing or making disagreeable leaks and when compressed air has to be used for other purposes it is better to have compressed air apparatus throughout, than to have part pneumatic and part hydraulic. Even where compressed air or water under pressure is not available there is the hydraulic jack worked by hand to fall back

upon. Street railways have not yet begun to realize as steam roads have, the value of compressed air or water in assisting around the shop. The jack for removing wheels can be home made and should be strong enough to lift one end of a car when placed under the axle. Otherwise hand jacks will have to be used when the wheels are being lifted clear of the track. The cost of putting in sectioned rail on one pit is very small compared with the annual saving on wheel renewals. There is certainly no good reason why it should cost street railways several times as much as steam roads to remove wheels when the additional work due to the presence of the motor is left out of account.

CAN PARALLEL MICHIGAN PLANK ROADS

Michigan street railways may parallel and adjoin plank roads with their right of way. The supreme court has decided in the case of the Detroit and Birmingham Plank Road Company against the Detroit Suburban Company, that the use of the plank road as part of the right of way by an electric railway for the transportation of persons in cars, in consideration of tolls paid to the railroad company, cannot be said to be a use inconsistent with the rights and franchise of a plank road company. The suit was brought by the plank road company to restrain the construction of the electric railway out Woodward avenue to Highland Park and beyond. The railroad company does not encroach on the plank road but is constructed beside it. The plaintiff asked for an injunction on the ground that many persons would ride upon the cars, who would otherwise drive to and from the city, thus resulting in a loss of tolls.

THREE-WIRE SYSTEM AT MILWAUKEE.

Since writing the editorial on the three-wire system in our January issue, we have learned that the three-wire system was actually tried on the West Side Street Railway, at Milwaukee, in the summer of 1890. J. H. Vail, then chief engineer of the Sprague Electric Railway & Motor Company, had charge of the work. G. W. Knox, now electrician of the Chicago City Railway, was also engaged there at that time. The main difficulty was in getting the sides to balance. The object of the trial was to prevent a heavy drop of potential, caused by insufficient bonding and overhead copper. At that early day in electric railroading, it is not to be wondered at that the complication of the three-wire system made its use for the time impracticable, as there were so many difficulties to be overcome that simplicity often was of more importance than efficiency, and refinements that have since come into use had to be temporarily discarded, until a time when the electrical engineer could give them sufficient attention to successfully work them out.

The longest continuous street railway in the United States is said to be the forty-two-mile line from Lowell to Haverhill, Mass.

NEWS FROM THE CITIES

Alabama.

ANNISTON, ALA.—A twenty mile electric railway is planned between Anniston and the coalfields of St. Clair county. Power will be taken from falls on the Coosa river.

Arizona.

PHOENIX, ARIZ.—J. C. Dobbins has been granted an electric railway franchise.

Arkansas.

LITTLE ROCK, ARK.—The United States Court has ordered the sale within sixty days of the Little Rock Street Railway Company.

HOT SPRINGS, ARK.—The scheme to build an incline railway 2,000 feet long up West Mountain, has been revived by a company with \$300,000 capital. G. W. Baxter is the promoter, and B. F. Small & Co., of St. Louis, and S. W. Fordyce, of the St. Louis Southwestern Railroad, are backers.

California.

SAN FRANCISCO, CAL.—New engines will be put in by the Market Street Railway Company.

ST. HELENA, CAL.—U. S. McGeorge has applied for a franchise for an electric road from Napa to Calistoga.

SAN FRANCISCO, CAL.—The Market Street Railway Company will change its Ellis street cable system to electric

SANTA MONICA, CAL.—The Santa Monica & Soldiers' Home Railway Company is investigating storage batteries with a view to converting its lines to electricity.

SAN JOSE, CAL.—Francis Smith, of San Francisco, has been granted a franchise to build an electric street railway from Saratoga to Santa Clara and San Jose, twelve miles long.

Canada

OTTAWA, CAN.—The Ottawa Electric Railway Company will put down two miles of Shanghai T rail.

HAMILTON, ONT.—Maitland Young has formed the Burlington & Lake Shore Electric Railway Company, to build between Hamilton and Burlington.

TORONTO, CAN.—The following companies have applied for incorporation papers: Brantford, Port Dover & Radial Electric; Hamilton, Valley City & Waterloo; Kingston & Gananaque Electric; St Thomas Radial Electric.

Chicago.

CHICAGO.—The Cicero & Proviso Street Railway Company has increased its capital to \$2,500,000.

CHICAGO.—The Chicago Title & Trust Company has been appointed receiver of the Harvey Transit Company.

CHICAGO.—D. H. Louderback has moved his office to the North Chicago Street Railroad building, 444 North Clark street.

CHICAGO.—The Chicago Belt Line Street Railroad Company has been incorporated with \$500,000 capital by F. J. Phillips, G. E. Loehr and Andrew Matson.

CHICAGO.—A final assessment of 25 per cent has been called on the stock of the Columbia Construction Company, which holds the contract for building the Northwestern Elevated Road.

CHICAGO.—Receiver has been applied for, for the Harvey Transit Company, Harvey, Ill., on complaint of the Scully Steel & Iron Company, which holds an unsatisfied judgment for \$400.

CHICAGO.—The North Chicago and West Chicago Street Railroad Companies have secured franchises for several miles of new electric lines, which will admit the trolley to the down town streets.

CHICAGO.—The Chicago Belt Line Street Railway Company has given notice to the aldermen through Ald. Ballard that it will apply for a franchise over the streets wanted by the General Electric Railway Company.

CHICAGO.—The General Electric Railroad Company has been incorporated with \$5,000,000 capital by Daniel M. Simmons, 836 West Twelfth street, William A. Youmans, 700 West Sixty-third street, George Pfeiffer, 211 Herald building. Henry Brandenburg, 90 Washington street, knows about construction.

CHICAGO.—George O. Fairbanks, assignee, received bids in writing until 5 p. m., January 28, for all the uncollected accounts, notes, etc., of the Railway Equipment Company. A list is on file in the county court and at assignee's office. The sale is for cash, and 10 per cent of amount of bid must accompany it. The court yesterday confirmed the sale of the stock to Bernard Hartley for \$500.

Connecticut.

BRIDGEPORT, CONN.—The Bridgeport Traction Company will extend its line to West Haven and Westport.

WINDSOR, CONN.—The Windsor Locks & Suffield Company has been incorporated to build an electric line.

NEW BRITAIN, CONN.—The Central Railway & Electric Company is in the market for forty foot double truck cars.

HARTFORD, CONN.—The Hartford, Manchester & Rockville Tramway Company will extend its Rockville Division.

ROCKVILLE, CONN.—The Rockville, Stafford & Southbridge Tramway Company contemplates constructing a branch electric road

MIDDLETOWN, CONN.—The Middletown H. R. R. Company will probably make extensions this spring, so writes E. W. Goss, superintendent.

WESTPORT, CONN.—The Westport & Southport Electric Railway Company has been incorporated to operate in Weston, Southport and Fairfield.

HARTFORD, CONN.—Negotiations are said to be under way for the consolidation of the Hartford & West Hartford Horse Railroad Company, the Hartford Light & Power Company and the Hartford Suburban Railway Company.

MILFORD, CONN.—The Connecticut Traction Company has applied for a franchise to build an electric road from Milford to Stratford Bridgeport, Merwin's Point and Meadow's End. J. D. Brown, J. W. Thompson and S. H. Baldwin are interested.

NORWICH, CONN.—E. P. Shaw, Jr., and Charles P. Cogswell, of Norwich, and Tucker, Anthony & Co., of Boston, are the promoters of the new electric road to connect Norwich and New London, eleven miles. These people are all interested in the Norwich Street Railway Company, but the new company will be entirely separate. The power house will be in Montville and the car house in Norwich. Construction will begin as soon as the frost leaves the ground.

Delaware.

DOVER, DEL.—The Dover & Milford Electric Railway Company will be incorporated with \$500,000, to build a line to Milford via Camden, Magnolia and Frederica.

District of Columbia.

WASHINGTON, D. C.—Permission is to be given the Eckington & Soldiers' Home Railway Company to extend its trolley line.

WASHINGTON, D. C.—The Columbia Railway Company has secured favorable action by the House District Committee on the bill granting it the right to lay additional tracks.

WASHINGTON, D. C.—Fire destroyed the car sheds of the Brightwood Railway Company, together with fourteen electric cars. The loss is \$85,000, partly covered by insurance.

WASHINGTON, D. C.—The new car house of the Brightwood Electric Railway will have track for forty cars, turn tables, etc. Officers of the company are visiting the large cities and investigating motor equipments.

WASHINGTON, D. C.—The Washington & Brighton Railway Company will be incorporated to build an electric railway to a point on Chesapeake Bay, in Calvert Co., Md. Incorporators, Horatio Browning, Clarence F. Normet, Levi Woodbury and F. P. May.

WASHINGTON, D. C.—A bill incorporating the Capitol Railway Company has been reported from the House District Committee. The road is to carry passengers, parcels, milk and truck and may use for propulsion anything but steam locomotives or overhead trolleys within the limits of Washington.

Florida.

TAMPA, FLA.—E. R. Gunby has been granted a franchise for an electric road from Fort Tampa City.

AVON PARK, FLA.—J. C. Burleigh is in the market for second hand rails, etc., to be delivered at Haines City.

JACKSONVILLE, FLA.—L. R. Benjamin wants generators, overhead material and a few cars for an electric railway.

OCALA, FLA.—The Silver Springs & Western Railway Company has been formed by F. A. Teague, A. McIntyre and others, to build a six-mile electric line between Ocala and Silver Springs.

Georgia.

SAVANNAH, GA.—The Drake & Stratton Company has been granted a franchise for an electric road.

MACON, GA.—Tucker, Anthony & Co., Boston, have bought the Macon Consolidated Street Railway Company.

SAVANNAH, GA.—It is rumored that John R. Young has been appointed receiver of one of the electric roads in this city.

ATLANTA, GA.—A special committee of the city council has recommended a ninety-three pound rail nine inches high as a standard.

SAVANNAH, GA.—F. M. Baker, general manager of the Addison & Pennsylvania Railway Company, and a New York state railroad commissioner will build an electric line to Darien.

Illinois.

AURORA, ILL.—The Aurora Street Railway Company has been granted an ordinance for extensions.

OTTAWA, ILL.—The Ottawa Electric Street Railway Company has given notice that it will cease operating.

DECATUR, ILL.—R. H. Yates and C. F. Taylor are negotiating the purchase of the City Electric Railway Company for a Chicago syndicate.

BLOOMINGTON, ILL.—W. H. Patterson, has secured all his franchises in Peoria, and construction of the Peoria and Pekin electric road will begin this spring.

PEORIA, ILL.—Frank W. Horne has been appointed receiver of the Fort Clark Electric Railway Company on petition of the Illinois Trust & Savings Bank, which holds a mortgage of \$250,000.

OTTAWA, ILL.—It is reported that the General Electric Company has sold its interest in the Ottawa Electric Street Railway to a local syndicate, represented by Mayor Schoch, which will improve the line.

VENICE, ILL.—Franchise was granted January 4 to Jenks, Meyer & Co., of St. Louis, to construct a street electric railroad from Venice to Granite City. Work is to commence within sixty days, and be completed within six months.

Indiana.

ANDERSON, IND.—C. L. Henry has secured all the right of way for electric line to Alexandria.

JEFFERSONVILLE, IND.—E. J. Howard, president of the City Street Railway, expects to carry the project through.

VINCENNES, IND.—The Vincennes Electric Street Railway Company will build two miles of track to a park and manufacturing section.

HAMMOND, IND.—The Hammond Electric Street Railway Company will double track its line this season, probably using T rails and \$100,000 will be expended in improvements.

ALEXANDRIA, IND.—The Madison County Belt Railway Company has been incorporated with \$150,000 capital, by C. A. McNair, T. A. Mysenburg, G. T. Cran and J. L. Blair.

MARION, IND.—Upon suit by the Metropolitan Trust Company, New York, Judge Baker, in the Federal Court, ordered the sale of the Queen City Electric Street Railway Company to satisfy a judgment for \$79,551. The road will be sold March 6, by Howard Cole, special master in chancery.

NORTH JUDSON, IND.—Charles H. Conner, New Albany, president; Fred W. Munson, Chicago, vice-president; George W. Brown, Indianapolis, treasurer; E. S. Scott, Logansport, secretary and superintendent, are officers of a proposed electric line to Bass Lake station on the Erie road, to be run in connection with a Chataqua summer resort, which is to be completed this spring.

WASHINGTON, IND.—L. C. Fritch, president and general manager of the Washington Street Railway Company wants to buy the following equipment, either new or in first-class condition if second hand, to change the line from horse to electric: one generator 100 to 120-horsepower M. P. type; three motors, each 20 to 30-horsepower for single equipment with or without trucks, and three pairs of McGuire trucks, lightest make.

Iowa.

FORT DODGE, IA.—S. T. Meservey has transferred his electric railway franchise to the Fort Dodge Electric Light & Power Company.

Kansas.

WICHITA, KAN.—The Wichita Electric Railway & Light Company will do considerable new work this season.

ATCHISON, KAN.—Four additional miles of track will be laid by the Atchison Railway and Electric Light Company.

CENTRALIA, KAN.—The Centralia, Seneca & Pawnee Electric Railway Company has been incorporated with \$200,000 capital by A. W. Slater, J. C. Clark, S. W. Burtch, A. L. Coleman, John S. Hidden, F. A. Stickel, W. S. Domer, Centralia; R. M. Emery, A. Wells, Seneca.

Kentucky.

COVINGTON, KY.—The South Covington & Cincinnati Street Railway Company may extend its line.

MT. OLIVET, KY.—An effort is being made to organize a company to build an electric line to Maysville, and to secure appropriations from Robertson and Harrison counties for a bridge.

MT. STERLING, KY.—John P. Martin, of Xenia, O., will build eleven miles of electric line from this place to Sharpsburg. Both water power and steam will be used to drive the generators.

Louisiana.

NEW ORLEANS, LA.—The St. Charles Street Railroad Company is about to open bids for reconstruction.

NEW ORLEANS, LA.—The Canal & Claiborne Railroad Company has applied for permission to use electric power. This is the only line in the city operated by horses.

Maine.

ORONO, ME.—Contract for building the Bangor, Oldtown & Orono Street Railway has, it is said, been awarded to George E. Macomber.

SACO, ME.—The Massachusetts Car Company has been incorporated with \$300,000 capital, to manufacture cars, snow plows, trucks, etc. President, G. Arthur Hilton, Milton, Mass.; treasurer, William G. Wheildon, Stoneham, Mass.

AUGUSTA, ME.—The York County Electric Railway Company, with \$1,000,000 capital, has applied for authority to build through Kennebunkport, Lyman, Alfred, Waterboro, Newfield, Limerick, Parsonfield, Cornish, Limington, Hollis, Buxton, Saco and Biddeford.

Maryland.

OAKLAND, MD.—An electric line is proposed from Oakland to Deer Park.

BALTIMORE, MD.—The City & Suburban Railway Company will buy fifty cars.

BALTIMORE, MD.—The Baltimore, Middle River & Sparrow's Point Railroad has applied for additional franchises.

ANNAPOLIS, MD.—Franchises have been asked for by the Brighton Beach & Bay Ridge Electric Railway Company.

FREDERICK, MD.—The project of building an electric road between Frederick and Middletown has been revived. It will be eight miles long.

TOWSON, MD.—A site for a large power house has been purchased by the Mt. Washington Light & Power Company. Thomas Kennedy, of Mt. Washington, is the architect.

BOONSBORO, MD.—The South Mountain Electric Railway will probably be built to Keedysville. Half the stock has been subscribed, and Dr. A. W. Lakin, Dr. S. S. Davis, Samuel Knode and others are disposing of stock.

BALTIMORE, MD.—A mortgage for \$750,000 has been executed by the Baltimore Traction Company, to the Maryland Trust Company, as trustee. The proceeds of the loan will be used to pay for improvements and extensions, and to take up the floating debt.

BALTIMORE, MD.—The Frederick-McCabe Construction Company has been incorporated with \$50,000 capital, to do electrical work, including construction of power stations. Lawrence N. Frederick is president, Lawrence P. McCabe, manager, Frank H. Sloan, consulting engineer.

BALTIMORE, MD.—The Baltimore county commissioners have granted a franchise to the Edmondson Avenue, Catonsville & Ellicott City Electric Railway Company. Ground has been purchased for a power house. Cars will be thirty-three feet long, and the road is to be running by July.

BALTIMORE, MD.—The Lake Roland Elevated Railway has been purchased by the City and Suburban Railway Company. The capital stock of the elevated road is \$1,000,000, and the bonds aggregate \$1,000,000. The City & Suburban paid \$250,000 for the stock, and assumed liability for the 5 per cent interest on the bonds.

Massachusetts.

HULL, MASS.—The Hull Electric Railway Company has been granted a franchise.

LOWELL, MASS.—The Lowell & Suburban Railway Company will extend its line to Tyngsboro.

BOSTON, MASS.—The G. A. Lancaster Elevated Railway Company is endeavoring to secure a franchise.

ABINGTON, MASS.—The Abington & Rockland Electric Railway will be bonded for \$100,000 to pay for construction.

SPRINGFIELD, MASS.—Stockholders of the Springfield Street Railway Company have voted to extend to Holyoke.

BOSTON, MASS.—The West End Street Railway Company lost its Columbus avenue barn and thirty-five cars by fire.

NEWTON, MASS.—The Newton Street Railway Company has asked for a franchise in Newton, Watertown and Waltham.

NEW BEDFORD, MASS.—The Street Railway Company will make extensions, and has increased its power house equipment.

HINGHAM, MASS.—E. L. Ripley, C. B. Barnes and P. B. Bradley propose to take \$55,000 stock in the Hingham Electric Street Railway, and build the road.

HOLYOKE, MASS.—The Holyoke Street Railway Company is about ready to contract for power house equipment. The capital stock will soon be increased.

NORTH ABINGTON, MASS.—Bonds amounting to \$100,000, bearing less than 6 per cent interest, will be issued by the Rockland & Abington Street Railway Company.

GREENFIELD, MASS.—H. T. Prince, of Leominster, and others will build an electric road to Turner's Falls. The capital is \$50,000. A \$13,000 bridge will be built.

WORCESTER, MASS.—The Worcester & Suburban Street Railway Company has absorbed the Worcester, Leicester & Spencer, and the Worcester & Millbury street railway companies. This is really a consolidation of the two older companies. The capital is \$550,000, and the total mileage twenty miles.

GLOUCESTER, MASS.—Contract for building the Beverly, Wenham & Gloucester Electric Railway, eighteen miles long, has been awarded to the Worcester Construction Company, of Worcester, Mass. The contract includes the cars, etc. P. McGrath will superintend the work, which will begin in March.

BOSTON, MASS.—Preparations are being made, it is reported, to replace steam power with electricity on the local lines of the New York, New Haven & Hartford Railroad. Work is to begin first on the Nantasket Beach line, which is ten miles long, and on the Warren & Bristol line, which is twenty-one miles long.

Michigan.

GRAND HAVEN, MICH.—An electric railway franchise has been granted to George W. Jenner.

SAGINAW, MICH.—The Eddy, Saginaw & Bay City Street Railway Company ordinance has passed.

DETROIT, MICH.—Strathearn Hendrie has secured all the franchises for an electric road to Pontiac and Orchard Lake.

DETROIT, MICH.—The injunction restraining the Detroit Railway from operating under its ordinance has been dissolved.

DETROIT, MICH.—The new Detroit Railway Company has established its offices at rooms 308 and 309 Hammond building.

PAW PAW, MICH.—J. W. Free, G. W. Longwell, C. R. Avery, C. W. Young and M. E. Whalen are interested in a proposed electric railway.

DETROIT, MICH.—Christy Bros., of Akron, O., will soon buy overhead material and iron poles for forty miles of track for the new Detroit Railway Company.

MOUNT CLEMENS, MICH.—The Street Railway & Dock Company has been incorporated with \$25,000 capital by B. B. Coursin, E. Van Jones, George L. Fisher.

ADRIAN, MICH.—Frank E. Snow, Detroit, receiver of the Adrian Electric Railway Company, will buy one generator, one car, new motors and equipment for five cars and overhead material.

DETROIT, MICH.—The Detroit Railway will build three car houses, and is in the market for four 750-horse-power engines, two 250-horse-power engines and direct coupled generators. It is the intention to have the road in operation by July 1, if possible.

LANSING, MICH.—The City of Detroit has been finally defeated in its attack on the Citizens' Street Railway Company. The supreme court of Michigan has decided that the decision of the United States court of appeals was final, and that the franchise is good until 1909.

Mississippi.

VICKSBURG, MISS.—A trolley line will be built by the Interstate Transportation Company from its gravel pits to the Mississippi river.

MISSISSIPPI CITY, MISS.—George W. Pierce has been granted permission to build a horse car line. It must be in operation within ninety days.

PASS CHRISTIAN, MISS.—The Gulf Coast Electric Railroad Company has been given a charter to Biloxi. J. B. Cable and Dr. G. W. Bennett, Long Beach; A. M. Dahlgren, Biloxi, are interested.

VICKSBURG, MISS.—Judgment for \$15,000 against the Vicksburg Electric Street Railway Company has been given J. H. Benedict, of New York, in the Federal court. Unless the judgment is satisfied within ninety days from January 7, the company's franchise and real and personal property will be sold.

Missouri.

ST. LOUIS, MO.—The Missouri Railroad Company will apply for a franchise to extend its Tower Grove line.

OREGON, MO.—Construction is progressing on the electric line to Forest City. It is believed July 1 will see cars running.

SEDALIA, MO.—The Sedalia & Brown Springs Railway Company will be built this season, and an issue of \$80,000 in bonds having been made.

JOPLIN, MO.—The Joplin Electric Railway & Motor Company has been sold to the Carthage, Webb City, Joplin & Galena Railway Company.

OREGON, MO.—Judge Daniel Hulatt, A. H. Bailey, M. D. Walker, Jacob King and Edward Gibson have obtained \$10,000 towards an electric line to Forest City.

ST. LOUIS, MO.—The Clayton & Delmar Avenue Railway Company will build a power house at Clayton. The company has been granted a franchise to build a new line to Creve Coeur Lake.

ST. LOUIS, MO.—The Clayton & Forest Park Railway Company has been incorporated by Thomas K. Skinker, John L. Boland, John C. Lamphier, John T. Davis, Jr., Benjamin F. Thomas, Charles Robyn.

ST. LOUIS, MO.—The St. Louis Belt Railway Company has been incorporated with \$2,000,000 capital by Charles Green, L. M. Rumsey, R. C. Kerens, Moses Rumsey, John Mullally, to cross all the street railways.

Nebraska.

LINCOLN, NEB.—F. W. Little has been superseded by Brad D. Slaughter as the receiver of the Lincoln Street Railway.

NEBRASKA CITY, NEB.—The Nebraska City Street Railway Company contemplates adopting electricity and extending to Kearney, Greggspport and Prairie City.

SOUTH SIOUX CITY, NEB.—The South Sioux City & Covington Street Railway may extend its line to Crystal Lake, and change its equipment to electric, leasing power.

LINCOLN, NEB.—Default on \$12,000 interest led to the appointment of F. W. Little, receiver for the Lincoln Street Railway Company. The company's bonded indebtedness is \$1,300,000.

New Hampshire.

HAMPTON, N. H.—An electric road to Exeter is planned by a Chicago syndicate.

MANCHESTER, N. H.—The City & Suburban Electric Railroad Company has applied for a charter with \$500,000 capital. John C. Ray, O. D. Knox, Fred T. Dunlap and others, are interested.

CONCORD, N. H.—The Merrimac Valley & St. Lawrence Electric Railway, Thomas Saunders, of Haverhill, president, is to be incorporated to build a most extensive railway, running the length of the state of New Hampshire and up into Canada.

WINDHAM, N. H.—Representative Barker will introduce a bill in the legislature to incorporate the Merrimac Valley & St. Lawrence Railroad. A contemplated electric line from the state line, connecting with the Lowell, Lawrence & Haverhill system, through Nashua and Manchester, and up the Merrimac Valley.

New Jersey.

TRENTON, N. J.—The application of S. D. Wilson for a receiver for the Trenton Passenger Railway Company has been denied.

ATLANTIC CITY, N. J.—The Brigantine Transit Company will double track its seven miles of road and increase its power house equipment.

ELIZABETH, N. J.—John W. Whelan, receiver of the J. W. Fowler Car Company, has notified creditors to prove claims within sixty days from January 8, or they will be excluded from dividends.

HACKENSACK, N. J.—The National Trolley Company has been incorporated with \$50,000 capital to build roads between Fort Lee, Englewood and Hackensack. Delos Culver, Jersey City, is president.

HOPATCONG, N. J.—The Hopatcong Transportation & Power Company will build an electric road along the east side of Lake Hopatcong, from the Delaware, Lackawanna & Western station. The company was formerly the Hopatcong Steamboat Company. Its capital has been increased from \$20,000 to \$100,000. Theodore F. King, of Landing, N. J., is president, and O. F. G. Megil, of 87 Nassau street, New York, is secretary.

New York.

WATERTOWN, N. Y.—The Watertown Street Railway Company will extend its line three miles.

WATERLOO, N. Y.—The Waterloo, Seneca Falls & Cayuga Lake Railway Company has been granted a franchise.

UTICA, N. Y.—The car barn of the Oneida Street Railway Company was burned, together with four cars. Loss, \$6,000.

ALBANY, N. Y.—Daniel Secor is promoting an electric road thirty-two miles to the villages of New Scotland and Berne.

NEW YORK, N. Y.—John F. McCartney has been appointed receiver for the New York Electrical Manufacturing Company.

NEW YORK, N. Y.—The Third Avenue Railroad Company has increased its capital stock from \$7,000,000 to \$9,000,000.

WILLIAMSVILLE, N. Y.—It is reported that the Buffalo & Williamsville Electric Railway Company will extend its lines six miles.

AUBURN, N. Y.—The Auburn City Railway Company is reported sold to New York capitalists, who are contemplating extensions.

NEW YORK, N. Y.—It is reported that the Staten Island Rapid Transit Company will change its motive power to electricity and extend its line.

NEW YORK, N. Y.—The Dressel Railway Lamp Works has been incorporated with \$50,000 capital, by George C. Dressel and Frederick W. Dressel.

ALBANY, N. Y.—The Port Richmond & Prohibition Park Electric Railroad Company has been permitted to change its name to Staten Island Traction Company.

NEW YORK.—The People's Traction Company has been incorporated with \$1,500,000 capital, to build twenty and one-half miles of street surface railway at the north end of New York city.

AUBURN, N. Y.—J. H. Vail, of New York, is negotiating the purchase by a New York syndicate of the Auburn City Electric Railway. If successful, improvements will be made and a new line built.

FRANKFORT, N. Y.—The new company which has purchased the Frankfort & Ilion Street Railway is controlled by J. Ledlie Hees, president; A. B. Calvin, vice-president; and R. T. McKeener, secretary and treasurer.

BROOKLYN, N. Y.—The Clonbrock Steam Boiler Company has been incorporated with \$200,000 capital to manufacture boilers and steam fittings, by M. B. Morris, Brooklyn; T. J. Lawler and John Harlin, New York.

NEW YORK.—The Nikola Tesla Company has been incorporated with \$5,000 capital, to manufacture machinery, electric motors and generators. Incorporators, Edward D. Adams, Alfred S. Brown, New York, and Charles F. Coaney, Summit, N. J.

ROCHESTER, N. Y.—The Charles F. Burns Company has been incorporated to manufacture and sell electric railway supplies. Capital, \$5,000; incorporators, Charles F. Burns, Ezra M. Higgins, Alfred Green, William J. Moran and Robert Bannard.

NEW YORK, N. Y.—Again it is reported that the Second Avenue Railroad has been sold to a syndicate represented by J. & W. Seligman & Co., S. H. G. Stewart and Clarke, Dodge & Co., and the equipment will be changed to cable or storage battery.

HERKIMER, N. Y.—J. Ledlie Hess, Fonda, and R. Townsend McKeever, Gloversville, are reported to have acquired the horse railways which connect Herkimer, Mohawk, Ilion and Frankfort, which will be consolidated and operated by electricity.

GLENS FALLS, N. Y.—The Horicon Improvement Company has been incorporated to build a cable road from Lake George to the top of Prospect Mountain, a distance of 72,000 feet. Capital, \$150,000; directors, Walter M. Peck, Harry M. Peck and A. B. Colvin, all of Glens Falls.

PORT JERVIS, N. Y.—The Port Jervis & Suburban Railway Company will build this season. Following are the officers: P. J. Horan, Scranton, Pa., president; Benjamin Ryall, Port Jervis, vice-president; H. H. Archer, Scranton, secretary; C. E. Cuddeback, Port Jervis, assistant secretary.

NEW YORK, N. Y.—The Rapid Transit Commissioners have decided to go ahead and build as much of the underground road as the \$50,000,000 will build. The line will go up Broadway to Fourteenth street, the west side route being Broadway and the Boulevard, and the east side route Fourth avenue and Forty-second street.

WHITE PLAINS, N. Y.—A railway three miles long will be built to Harrison by the Westchester County Central Electric Railway Company, which was recently incorporated with \$75,000 capital by Charles A. Johnson, F. H. Reed, Lloyd McK. Garrison, New York; S. H. Gainsburg and E. C. Sniffin, White Plains, and George W. Mansfield South Norwalk, Conn.

North Carolina.

WILMINGTON, N. C.—The Wilmington Street Railway Company will extend its line.

COLUMBUS, N. C.—An electric railway is to be built from Columbus to Tyron by a company of northern capitalists.

ASHEVILLE, N. C.—J. A. Neville, of New York, and J. S. Adams, of Asheville are interested in the proposed electric railway to Biltmore.

ASHEVILLE, N. C.—Charles A. Moore has bought the Asheville Street Railway for \$900 to satisfy an old judgment. J. G. Martin is now superintendent. The former owners will contest the sale.

Ohio.

MARION, O.—The Marion Street Railway Company will extend its lines.

ASHTABULA, O.—The Ashtabula Rapid Transit Company will extend to Saybrook.

MT. VERNON, O.—The Mt. Vernon Electric Railway Company will extend its lines.

CINCINNATI, O.—The Cincinnati Street Railway Company will electrify its Third street line.

SPRINGFIELD, O.—C. S. Courson has been granted a franchise for an electric road to Cedarville.

AKRON, O.—The Akron & Cuyahoga Falls Rapid Transit Company has received a new franchise.

MARION, O.—The Marion Electric Railway went into operation January 4, over seven miles of line.

CLEVELAND, O.—The Cuyahoga Suburban Railway Company has increased its capital from \$10,000 to \$50,000.

CINCINNATI, O.—The Mt. Adams & Eden Park Inclined Railway Company will issue \$500,000 additional stock.

WELLSTON, O.—Harvey Wells is president of a proposed electric line to Glen Roy, Coalton, Jackson and other towns.

CLEVELAND, O.—The Cuyahoga Suburban Railway Company will build 9½ miles of road this summer, using T rail.

LORAIN, O.—H. J. Reddington, president of the Amherst bank, is interested in a proposed electric road seven miles long.

YOUNGSTOWN, O.—Stockholders of the Youngstown Electric Street Railway Company have authorized building of extensions.

NILES, O.—Daniel Moynahan, owner of the Niles & Mineral Ridge Electric Street Railway Company, will make extensions in the spring.

YOUNGSTOWN, O.—The Youngstown Street Railway Company will be interested in a new bridge, required by one of its proposed extensions.

CLEVELAND, O.—The Cleveland Electric Railway Company's stockholders have authorized extensions and the purchase of additional cars.

EAST LIVERPOOL, O.—The East Liverpool & Wellsville Street Railway Company has been sold for \$804.83 at delinquent tax sale, to Walter B. Hill.

MT. VERNON, O.—The Mt. Vernon Electric Railway will want, before March 1, five cars with rails and line material for four additional miles of track.

CLEVELAND, O.—The stockholders of the Cleveland City Railway Company authorized the purchase of a 1000-horse-power generator and extension of lines.

WARREN, O.—The franchise of the Mahoning Valley Electric Railway Company has been extended until May 1, 1896, but the company will build this season.

ELYRIA, O.—Farmers will build an electric road from Milan to Elyria, twenty-nine miles, through Berlinville, Florence, Birmingham, Henrietta and South Amherst.

TOLEDO, O.—The Lakeside Association will build an electric road this season, connecting Tiffin, Lakeside, Fremont and Port Clinton. S. R. Gill, Lakeside, can give information.

LIMA, O.—Fire, January 12, destroyed the car barn and all the rolling stock of the Lima Electric Street Railway Company. The loss of \$35,000 is partially covered by insurance.

CINCINNATI, O.—The Cincinnati, Hamilton, Middletown & Dayton Traction Company has opened offices on the third floor of the Commercial Gazette building. Contracts will soon be let.

KENT, O.—The council has received an offer from the Seiberling Company, of Akron, to build an electric railway if permitted to charge five cents in Kent, twenty cents to Akron and sixty cents to Cleveland.

LORAIN, O.—The Lorain & Wellington Electric Railway Company has been incorporated with \$100,000 capital by E. M. Pierce, John Stang, Q. Gilmore, Lorain; H. G. Steele, North Amherst; J. W. Steele, O. F. Carter, Oberlin.

WELLSTON, O.—The Jackson, Wellston & McArthur Railway Company has been incorporated to build an electric railway. Capital, \$10,000; incorporators, Isaac E. Adams, Daniel J. Ryan, Edwin R. Sharpe and Edward B. McCarter.

WELLSTON, O.—The Wellston & Jackson Belt Railway Company will build an electric railway connecting Wellston, Jackson, Hamden, McArthur, Vinton, Akin's Mill, California and Wilkesville. Capital, \$500,000; incorporators, H. Wells, J. C. Clutts, C. L. Currier and A. D. Lutz.

CLEVELAND, O.—Contracts for rails and rolling stock for the Cleveland & Elyria Electric Railway will be placed by Christy Brothers, of Akron. Wooden poles will be used for the seventeen miles of track, of which sixteen miles will be T rail and one mile girder. There will be six motor cars and four trail cars.

ELYRIA, O.—The Elyria, Oberlin & Wellington Electric Railroad Co. has been incorporated by A. R. Webber, W. A. Breman, R. T. Reefy, W. B. Berdotha, Charles Metcalf, W. P. Steel, A. H. Johnson and Parks Foster. Capital, \$100,000. The company will build an electric road eighteen miles long, through Oberlin and Wellington, connecting at Elyria with the road running to Cleveland.

AKRON, O.—Christy Bros., of Akron, will contract at once for line and track material for the new Akron, Bedford & Cleveland Railway, which is to break ground as soon as the weather permits. They want 24 miles of 60-lb T rail and one mile of girder rail, wooden poles, eight motor cars, thirty-eight feet over all, with double trucks, and two 50-horse-power motors each. The motors and four trailers will be arranged for passengers and baggage. Christy Bros also will contract for the power house equipment, which includes two 350-horse-power engines, four 400 kilowatt generators, boilers, feed water heaters, etc.

Oregon.

SALEM, ORE.—The State Insurance Company has secured the Salem Motor Railway Company on a lien of \$30,000.

PORTLAND, ORE.—The Tillamook Electric Railway Company, Tillamook, has been incorporated with \$500,000 capital.

UNION, ORE.—The Union Street & Suburban Railway Company has been incorporated to operate the local railway as a freight and passenger line, and to build a 9-mile extension to Cove and to Eagle Valley. James Hutchinson is president, Nelson Schoonover, vice president and general manager, and James Raymond, secretary and treasurer.

Pennsylvania.

EASTON, PA.—The Easton Transit Company will extend its line this season.

LOCK HAVEN, PA.—The Lock Haven Street Railway Company will extend its line to Salona.

MECHANICSBURG, PA.—The Cumberland Valley Traction Company has been given a franchise.

COLUMBIA, PA.—The Columbia & Donegal Electric Railway Company will extend its line three miles.

NORRISTOWN, PA.—Shepp Bros. announce that they will begin work in the spring on the electric line to Ambler.

CONSHOHOCKEN, PA.—The electric railway connecting this place and Norristown was on January 2, placed in operation.

CHESTER, PA.—The Philadelphia, Castle Rock & West Chester Railway Company will probably construct its line this season.

WASHINGTON, PA.—It is reported that the Washington Street Railway has been sold to a syndicate, which will extend the line.

PHILADELPHIA, PA.—The Philadelphia Traction Company will issue \$5,000,000 additional stock to pay for improvements.

SCOTSDALE, PA.—The Scottdale, Everson & Bradford Electric Street Railway Company has been granted a franchise. Work may be begun this season.

ALLENTOWN, PA.—The Allentown & Lehigh Valley Traction Company is making surveys for extensions to Kuntztown, Topton, Macungie, Emaus and Trexlertown.

CHESTER, PA.—The Media, Middleton & Aston Trolley Company has paid \$4,100 for franchises through the city and county, and will soon begin construction.

GREENSBURG, PA.—The Greensburg & Hempfield Electric Street Railway Company has been sold to the Greensburg, Jeanette & Pittsburg Electric Railway Company.

STROUDSBURG, PA.—M. F. Coolbaugh and E. N. Peters have been appointed receivers of the Delaware Valley Electric Railway Company now under construction to Bushkill.

PHILADELPHIA, PA.—It is reported that J. Luttrell Murphy, Chicago, Walter B. Kendall and John A. Connelly, Philadelphia, have bought the Gettysburg Electric Railway Company.

POTTSVILLE, PA.—The Inter County Street Railway Company has gone into the hands of receivers, F. Kulp and S. G. Seligman, having been appointed to take charge of the property.

ECONOMY, PA.—The Economy Street Railway Company, of Beaver county, has been incorporated with \$30,000 capital to build five miles of road. Hartford Brown, Rochester, is president.

POTTSVILLE, PA.—The Tamaqua & Pottsville Electric Railroad Company has given a \$250,000 mortgage to the Columbia Avenue Saving Fund Safe Deposit & Trust Company, Philadelphia.

YORK, PA.—The York Street Railway Company will be extended to Manchester, Dallastown, Dover and Wrightsville, if the legislature passes the pending act permitting street railways to carry freight.

STRASBURG, PA.—Citizens have subscribed \$10,000 towards the Strasburg Electric Railway Company. A. Herr, B. B. Gontner, J. F. Ingram, B. W. Zook and E. C. Musselman, are the committee on cost of construction and equipment.

NANTICOKE, PA.—New lines will be constructed by the Nanticoke Traction Company, which has recently succeeded the old People's Street Railway Company. K. M. Smith, of Alden, is president, and Charles Haddock, of Luzerne, is secretary and treasurer.

NORRISTOWN, PA.—The Citizens', Norristown, Montgomery County, Saratoga, Royersford & Collegeville and the Perkiomen Creek Electric Railway Companies have been merged into the Schuylkill Valley Traction Company. Construction will be carried on this season.

CHESTER, PA.—John MacFayden, superintendent of the Chester Traction Company, wants to buy old summer horse cars to be used as trailers on a track of 5 feet 2½ inches gage. His company also contemplates an extension of six miles of T rail and two miles of 90-pound girder rail.

ALLENTOWN, PA.—A consolidation of the Allentown & Lehigh Valley Traction Company and the Allentown & Bethlehem Rapid Transit Company was effected January 16, whereby thirty miles of electric line come under one management. A mortgage for \$2,000,000 has been executed, covering both systems, to provide funds for taking up the \$500,000 mortgage on the Transit road and \$750,000 on the Traction road and the floating debt. Extensions are contemplated.

South Dakota.

HOT SPRINGS, S. D.—W. U. Germond and W. H. Train are seeking a franchise for an electric line.

Tennessee.

NASHVILLE, TENN.—It is reported that the Illinois Central Railroad Company is negotiating for the purchase of the Nashville & West Nashville Street Railway Company, in order to enter the city.

Texas.

VELASCO, TEX.—The City & Surf Side Electric railway is to be completed.

CORSICANA, TEX.—Capt. J. A. Townsend is interested in a proposed electric railway.

FT. WORTH, TEX.—The Ft. Worth Street Railway Company has increased its capital to \$100,000.

FT. WORTH, TEX.—The Ft. Worth Street Railway Company will put in twenty-six standard crossings.

UVALDE, TEX.—The Uvalde Street Railway Company has been granted a franchise for a horse, steam or electric railway.

BROWNSVILLE, TEX.—The \$160,000 bonus to the first company building an electric line to Corpus Christi or San Antonio is still available.

WACO, TEX.—The Waco Electric Railway & Light Company is reported to be consolidated with the Citizens Electric Railway Company, Henry C. Scott, of St. Louis, president of the latter company, having bought up 90 per cent of the \$200,000 of bonds issued by the first named.

Virginia.

CHARLOTTESVILLE, VA.—The Charlottesville City & Suburban Electric Railway Company has purchased the horse railway and will convert it into an electric line.

ALEXANDRIA, VA.—The Foreign Electric Traction Company has been incorporated to buy and sell electric railway patents. Capital, \$1,000,000; incorporators, Senator W. M. Stewart, Senator Eppa Hunton and G. Hatley Norton, Jr.

Washington.

SEATTLE, WASH.—The Ranier Power & Railway Company's plant was sold to Angus McIntosh, M. Ambrose and Frederick Bausman, for \$15,500 cash.

TACOMA, WASH.—The Point Defiance Street Railway Company has been transferred by Receiver Hurley to S. Z. Mitchell, for \$82,000. S. W. Hampton, Portland, is superintendent.

Wisconsin.

PUYALLUP, WIS.—The Tacoma Traction Company has been granted a permit for an extension.

KENOSHA, WIS.—W. H. Wheeler is attempting to organize a company to build an electric line to Truesdell.

BARABOO, WIS.—Marsh & Jackson are reviving the project to build an electric line from Devil's Lake to the Dells.

MARINETTE, WIS.—An extension of two miles to a new pleasure park will be built by the Marinette Gas, Electric Light & Street Railway Company.

MILWAUKEE, WIS.—The railroad committee of the city council has reported favorably on the ordinance of the Milwaukee & Wauwatosa electric line, and it is believed the council will pass it. Work will begin this season.

OSHKOSH, WIS.—The Central Wisconsin Electric Railway Company has been incorporated with \$1,000,000 capital by James K. Tillotson, Toledo; T. E. Ryan, Waukesha; L. M. Campbell and W. F. Gruenwald, Oshkosh. About thirty-five miles of road will be built.

MARION, OHIO, ROAD COMPLETED.

Marion, O., has a new electric street railway, operated by the Marion Street Railway Company, which received its franchise in April, a year ago. The officers are E. Durfee, president; G. Leffler, vice-president; George E. Turner, secretary and superintendent. Most of the construction has been done by home talent. The road is ten miles long, being of 60-pound T rail construction. The equipment consists of five American Car Company cars with Fulton Truck & Foundry Company imperial trucks, 25-horse-power motors, National fare boxes and McGuire Manufacturing Company's Columbia heaters. Power is leased. The car barn is one hundred and ten feet long, twenty-four feet wide, sixteen feet in the clear, with two tracks and pits extending the entire length.

E. K. Stone, superintendent of the Quincy Horse Railway & Carrying Company, Quincy, Ill., called on the REVIEW lately.

NEW HAMPSHIRE LEGISLATION.

New Hampshire is not so well supplied with electric railways that she can afford to restrict their extension and introduction by burdensome legislation. Yet this is precisely what her solons seem bent upon doing, and it is said the pending bill has every evidence of being passed by both houses, and that it will not be delayed for lack of the governor's John Hancock.

In some respects it is unobjectionable, though we cannot see any necessity for it whatever. In some other respects it is outrageous. The bill gives to city officials almost unlimited power to regulate operation, and if the whim suits, discontinue, at any time, operation for an indefinite time. That the law would be a great "snap" for city officials inclined to make the most of their official position cannot be concealed.

"They may order a street railway company to discontinue temporarily the use of any tracks in the public highways, whenever they deem that the safety or convenience of the public requires such discontinuance.

"Every such railway company shall, at its own expense, comply with and carry out such orders forthwith, and, in case of failure to do so, such town or city may proceed by writ of mandamus or other proper proceeding to compel the corporation to comply with its orders."

Construction must not only be under the personal supervision of the mayor or aldermen, but the materials selected for such construction must also be of such a kind and quality as seems best to the city fathers. With a whole city council to placate, the path of the poor supply man who dares to make a sale in New Hampshire, does not loom up with many rose bushes en route.

Just one instance of the utter incompetency and unfitness of city officials, especially aldermen, to pass on technical engineering problems, occurs to us in the San Jose, Cal., case, about three years ago. In spite of all the evidence of experienced men the company there was able to produce, the council forced a certain method of joint laying. The company protested, the plan was an absolute failure, but was finally given its choice of constructing in that manner or not at all. As it was upon the principal business street there was no alternative. The track was therefore so laid, in exact accordance with the instructions of city council. The work was done under the personal supervision of the city engineer, who, with the aldermen, pronounced it perfect. Within six months the street was in a fearful condition, and business men raised such a howl the council ordered the track torn up and relaid as the company had desired to lay it in the first place. As the pavement was asphalt, the expense was great, and cost the road over \$12,000 to relay, in addition to the extra expense incurred by the chosen method over what the right method would have cost. It was a complete back-down for the city council, but their chagrin, however great, could not be converted into dollars to make the road good for its absolutely unnecessary loss in money and time. We much less need cite the case of Mayor Pingree, of Detroit, who carried into the

official chair the personal prejudices of his ante-mayor days, and who has waged so bitter and vindictive war on the Citizens' road of that city. The relief granted by the supreme court of the state was a vindication of the company's rights and position, but only after nearly three years of costly litigation, during which time the whole city was made to suffer for extensions and improvements, which, but for the personal spite of the chief city official, would have been promptly made. These are but two of innumerable instances where the personal ends of officious officials have been indulged at the expense of the public and the railway companies.

Any reasonable man, it would seem, must realize that city aldermen, chosen as they are from a great variety of business connections, and serving one or two years at a term, cannot, in the nature of things, and however honorable—for it is rumored there are some honest aldermen—cannot and ought not be expected to be as capable of judging of a matter so full of important details, as those men whose money is invested in, and whose life work is a constant study of, so important and complicated a matter as a well built and well operated street railway.

Another of the thirty-seven sections of the bill deals very gently with steam roads, and if divorced from the bad company of its brother sections would be an excellent and desirable law. Section 30 reads thus:

"Section 30. Every railroad corporation established under the laws of this state, and operating railroads therein with steam for a motive power, are hereby authorized to operate their railroads by electricity, and for the purpose of making the necessary changes from steam to electricity as motive power, every such railroad corporation may, with the consent of the railroad commissioners and subject to the provisions of sections of this act, issue such an additional amount of capital stock as may be necessary to defray the expenses of making such change in motive power."

WORLD'S FAIR ACCELERATOR COMES BACK TO CHICAGO.

The magnificent specimen of the street car builder's art, which was exhibited by the Brownell Car Company, of St. Louis, at the World's Fair, is to come back to Chicago. It has been purchased by the North Chicago Street Railroad, to be used as a special car for theater parties and the like. This is probably the most expensive street car ever built. It is of Brownell's well known "Accelerator" type, with 20-foot body and 4-foot platforms. The color scheme of the interior is white and gold. The ceiling is decorated with paintings which cost \$2,000. These paintings have, as a subject, the progress made by civilization in America, between the time of Columbus and the World's Fair. The seats and backs are old gold silk plush, upholstered with curled hair. The curtains are satin damask, ivory and gold. The metal trimmings are gold plate of Roman gold finish, and the windows polished plate glass. Space does not permit us to go into further details.

TERRIBLE EXPLOSION AT DENVER.

West Side Power Station Denver Tramway Company Wrecked by Boiler Explosion.

At 10:40 p. m., January 30, one of the battery of twelve boilers in the Grand avenue power plant of the Denver Tramway Company exploded and wrecked the building, reducing it to the mass of ruins shown in our engravings. The boilers were of the horizontal return flue type, 5 by 16 feet, with sixty 4-inch tubes. The No. 5 boiler shown in Figure 2 was the one which exploded. It rose through the roof, the front two-thirds turning to the north and coming down through the roof as shown in Figure 5. The head and tubes were standing upright and rested on the pulley of a dynamo. Boiler No. 4, just beyond No. 5 which exploded, was tilted on end. The three boilers at the farther end of the battery were shaken loose from their foundations, as were also the two on this side of No. 5. The four at this end were not badly injured. There were three firemen and a visitor in the boiler room at the time of the explosion. The firemen were

taking out the ashes. One of them named Brown was thrown against the coal pile, but escaped without serious injury. Another named Bitzer was in about the position of B Figure 2. He was instantly killed and thrown out upon the railroad tracks. The other man named Walrod who was killed was at A Figure 2. He was in the pit taking out ashes. The visitor was immediately behind

this man on the coal pile and came out alive, but badly burned. The dynamos and engines were not injured, but the north and west part of the building is badly wrecked and will have to be entirely rebuilt.

The station was built in the spring of 1890, the intention of the company at that time being to operate only twelve cars. Business grew so rapidly that more machinery was put in place, and finally a new building was erected as an addition in which two 500-horse-power corliss engines, coupled together and belted to a line shaft, were installed.

Fortunately the company had sufficient power at its other stations to operate the cars so that they were run-

ning regularly on the morning following the explosion. For an emergency, however, Superintendent Durbin has resorted to a very peculiar and novel expedient. A 60-



CAME THROUGH THE ROOF.



HAVOC CAUSED BY THE EXPLOSION AT DENVER.

ton locomotive has been stationed at A, Figure 1, and its boiler has been connected to two high speed engines of 150-horse-power each, running four 62 kilowatt generators. By using another locomotive, two more high speed engines will be available.

At present writing the cause of the explosion has not been determined, but is being investigated by the insurance experts. The boilers were insured for \$3,000 apiece with the Hartford Insurance Company, of Hartford, Conn. Superintendent Durbin deserves credit for the prompt and efficient manner in which he met the emergency and took measures to maintain the service. The boilers were inspected by the insurance people last November and reported in good condition, so that the cause certainly would not seem to be defective boilers, and the men were experienced in the service, all of them having been in the company's employ several years. By some perversion of the truth the report got abroad among the daily papers that the exploded boiler was a Heine water tube. It is only justice to the makers of those excellent non-explosive boilers to state that the report was absolutely false.

LINSEED OIL INSULATING CLOTH.

A common practice in repairing burned out motors and dynamos has been to insulate with cloth and paper



well daubed with shellac. While fairly good at first, there is said to be a gradual deterioration in the qual-

ity of such insulation, owing to the shellac becoming brittle when subjected to variations of heat and cold. Moreover, it is said that fabrics impregnated with shellac lose strength in the course of time.

So well preserved are the oil paintings by the old masters, that attention has been called to linseed oil as an insulator. Tests showed that this oil is an excellent non-conductor of electricity. After exhaustive experiments, an insulating material composed of cloth and paper, treated with pure linseed oil by a special process, has been brought out by the Empire Electric Insulation Company, of Schenectady, N. Y. Thorough tests by some of the principal dynamo and motor manufacturers showed the high quality of this insulation, and led to its adoption by them, as well as by many of the larger electric railways.

Among the valuable points claimed for this insulation are: High insulating value, thereby giving maximum of insulation in minimum space; flexibility, permitting without injury the bending and creasing required in forming the insulation to the work; ability to withstand a high continuous heat without deteriorating in insulating value or flexibility; and uniformity of surface and consequently of insulating value. As the cloth can readily be torn into strips of any desired width, forming tape, this insulation is particularly well adapted to repairs on G. E. 800

and other motors. For this purpose, the manufacturers say, it is unequaled by anything on the market. It is also well adapted to field coil and converter work. Ready-made armature slots, tubes, cones, etc., of this material are furnished, a few of the forms being shown in the accompanying engraving. Special forms of any kind are made to order. By reason of their flexibility, these slots will withstand without breaking the strain of the wires bending over the ends.

WHITTINGHAM ELECTRIC HEATER.

Heating street cars in the winter time is constantly demanded by the traveling public. In one of the larger cities a passenger refused to pay his fare because a car was not warmed, and has brought suit against the company because he was ejected. Many styles of electric heaters are on the market and have been placed in the cars of electric railways, but some roads continue to use coal stoves. The Wallace Electric Company, No. 307 Dearborn street, Chicago, is introducing to the western states the Whittingham electric heater, which is different from the others, and is said to consume only six amperes of current as a maximum, and only three amperes when only half the heat is required.

The heater consists of eight wrought iron pipes the length of the car, four of which are attached to each riser, leaving no space without heat, as is the case with other styles of heaters. Each pipe contains a coil of German silver wire enclosed within a heat conducting insulating tube, which, with the pipe, is packed with chemically pure silica, by means of machinery. This construction is said to surround the wire with the best possible heat conducting medium, at the same time perfectly insulating it from the wrought iron radiating jacket. The pipes act similar to steam radiating pipes, which they resemble. They are hidden by the carpet which usually covers the riser. The pipe, it is said, can be bent in any position and straightened again without injuring the heater.

It is claimed that the life of the heater is practically that of the pipe, as it is impossible for the wire to reach a temperature which can have any injurious effect upon it. The radiating area is said to be 3,700 square inches, or from four to six times that of other makes, while the distribution of heat is uniform. The manufacturer says a single tube, in regular use, absorbs about three amperes at 140 volts, or 420 watts, while a load of 2,000 watts can be placed in the tube without any bad effect, and heaters have been operating continuously for nearly a year at a load of 110 watts per lineal foot. The temperature at all points is absolutely safe—180 degrees—for passengers, woodwork and the material of which the heater is made.

The ironwork of the heater is grounded, so that it is impossible for anyone handling the heater to get a

shock. Four pipes are run in series, two on each side of the car, and controlled by one handle of the switch-box, while the remaining four pipes are similarly connected and controlled by the other handle of the switch-board. This method makes practically two independent heaters. The switch-box has a fuse through which current passes to both heaters. The Wallace Electric Company has one of these heaters on exhibition at its warerooms, which has attracted considerable favorable comment from street railway managers, superintendents and electricians.

BROOKLYN'S GREAT STRIKE.

Brooklyn trolley lines have been interfered with by a strike of motormen and conductors, who, without previous notice, went out on January 14, 5,000 strong. The companies secured men to man their cars as rapidly as possible from other cities, but there was considerable delay in getting cars through, on account of the vandalism and belligerent attitude of the strikers. So violent did they become that it was necessary to call out the militia. The men, as is usually the case, were defeated. They had few grounds for striking in the first place, and their leaders admit that it was ill advised, especially when so many men were out of work.

On January 12 it was expected that an agreement was to be drawn up between the companies and their employes, to govern them for a year. The latter demanded an increase of wages for conductors, motormen and electrical workers; the regulation of number of apprentices to be employed; and supervision of the time tables, so that there would be more trips and increase in pay rolls, but a reduction in operating force. The absurdity of these demands is so apparent that it is unnecessary to dwell upon them.

There are some features of the strike which are unique. It was the first test of the alleged government protection of the companies on account of transporting United States mails. The militia and police were sufficiently strong to make it unnecessary to call upon the government. One of the railroad presidents was cited to appear before the U. S. Commissioner, on the charge of illegally using the sign "U. S. Mail" on his cars. The case was dismissed without hearing testimony on the part of the defense.

The strike is responsible for making Justice Gaynor known, and giving him an opportunity for adding to the voluminous strike literature of the United States. Justice Gaynor says in effect that the companies must run their cars or be in danger of forfeiting their franchises.

Justice Gaynor's decision reads:

It is my duty to declare the law of this case. This railroad corporation is not in the position of a mere private individual or company, carrying on business for private gain, which may suspend business temporarily or permanently at pleasure. On the contrary, it has a dual relation—a public relation to the people of the state and a private one to its stockholders. It must not be forgotten here, though it may seem to be growing not wholly forgotten elsewhere than in its chief aspect. It is a public corporation, having duties to perform to the public, which

transcend any obligation which, in its private aspect, it owes to its stockholders. It has received franchises of great value from the state, and had conferred upon it the state's transcendent power of eminent domain. In return it took upon itself the performance of public duties and functions, in the performance of which it is in law and in fact not an independent individual or entirety, but the accountable agent of the state. Though the principles are old and inherent in the idea of the sovereignty of the people, it would seem that in the recent rapid growth of corporate power, and of the tendency to use public franchises for the aggrandisement of individuals first and for the service and benefit of the public second, they have come to be somewhat overlooked, and need to be restated. They have often been declared by the highest courts of this state and the supreme court of the United States.

The duty of the company now before the court is to carry passengers through certain streets of Brooklyn, and to furnish, man, and run cars enough to fully accommodate the public. It may not lawfully cease to perform that duty for even one hour. The directors of a private business company may, actuated by private greed or motives of private gain, stop business and refuse to employ labor at all, unless labor come down to their conditions, however distressing for such are the existing legal, industrial, and social conditions. But the directors of a railroad corporation may not do the like. They are not merely accountable to themselves; they are accountable to the public first and to the stockholders second. They have duties to the public to perform and they must perform them. If they cannot get labor to perform such duties at what they offer to pay, then they must pay more, and as much as is necessary to get it. Likewise, if the conditions in respect of hours or otherwise which they impose repel labor, they must adopt more lenient or just conditions. They may not stop their cars for one hour, much less one week or one year, thereby to beat or coerce the price or conditions of labor down to the price or conditions they offer. For them to do so would be a defiance of law and of government, which, becoming general, would inevitably, by the force of example, lead to general disquiet, to the disintegration of the social order, and even the downfall of government itself. Experience shows the wisdom of our fathers in retaining at least some control of corporations to whom are given public franchises for the performance of public duties.

I do not think the present answer of the company is sufficient to prevent a writ from being issued. The claim of violence amounting to a prevention is not legally made out. Instances of violence, generally by other than the former employes of the company, is shown, but it is also shown that not only the police force of the city, but over 7,000 soldiers are preserving order, and I cannot believe that this company is not protected in its rights, nor do I think any question of fact is fairly raised on that head. Besides, the persistence of the company in failing to run its cars except as it may gradually get employes to accept its terms, being itself unlawful, as I have shown, must necessarily, by its bad example, tend to public disquiet, if not to some disorder. In respect of the question of hours and of wages between the company and its employes, its duty was to have gone on and now is to go on with its full complement of employes, having the right gradually and from day to day to supersede its employes if it can by new employes, who will work on its terms, or to supersede them all at once when it has obtained a sufficient number of new employes for that purpose; but in such a controversy it has not the right to stop its cars while it is thus gradually getting other men.

If the people of the state were running these roads they would not thus incommode and damage themselves, and it must not be forgotten that this corporation is intrusted with the running of these roads as the servant of the people of the state. It therefore only remains for me to determine the form of the writ, whether it shall be peremptory or alternative.

In one respect of the case there seems to be an issue of fact presented, and if such an issue be presented the law does not permit me to decide it and allow a peremptory writ, but requires to allow an alternative writ, which has the effect of reserving such issue of fact to be tried by a jury, or by the court if so agreed upon. At one place in its answer the company avers a reason why its employes would not continue working for it was "that it refused to run its cars as required by said employes in respect to the frequency with which cars should be run and the number of cars to be run." The number of cars or trains which a railroad shall run is left to the sound discretion of its directors, subject to review by the courts upon an application or writ of mandamus to make them run more if the public convenience requires it. Its employes may not assume to determine the number of cars to be run. If, however, this allegation in the answer refers to the controversy in respect to what are called trips, then it has no force, for the controversy is, in its essence,

one in respect of hours and wages. I concur in what Mr. Justice Cullen said in the other case in that respect, namely: "I do not regard the alleged attempt to abolish trippers as interfering with the running or management of the road; because I imagine the company would be allowed to run as many trippers as it chose if it would only pay the men \$2 a day for running the trips. In that case I imagine there would be no trouble. So that this is really a question of wages. Each party has the right to obtain the best terms it can, and as was said in the freight handlers' case, if the company cannot get men at a price that it thinks fair, it is bound to get them at a price it may deem exorbitant, because its duty is to run its road."

Judge Gaynor did not do as some thought he would, and endeavor to kill the companies at once, but granted them plenty of time to file an answer, which will probably end the controversy. He apparently did not grasp the actual situation, as his opinion seems to be based on the mistaken supposition that the companies wilfully abandoned the running of their cars. On the contrary, each company was even more desirous of running its cars than in times of peace. The only reason it was unable to run its cars as frequently as usual was on account of the unlawful interference of citizens over whom it had no control. These citizens were obstructing the tracks, made violent demonstrations and destroyed the property of the railways, and it was clearly the duty of the municipal and state authorities to protect the companies in the same manner they are bound to protect a private citizen, if another person destroys or attempts to destroy his residence or his business.

The companies had an abundance of men ready to operate the cars, which were operated in spite of the illegal interference on the part of men in no way connected officially or unofficially with the companies. If the street railways had made no attempt to operate their roads, had discharged all of the motormen and conductors without having others to take their places, then Judge Gaynor's point might have some basis on which to stand.

The city council of Brooklyn passed a resolution requiring motormen to be twenty-one years old, residents of the state for a year and of the city four months, and to obtain a license from the city under penalty of \$25. This resolution was vetoed by Mayor Schieren, because the council had no legal right to pass such a resolution. Mayor Schieren has conducted himself in a praiseworthy manner during the trying situation, which has won for him the commendation of all parties. W. J. Richardson was greatly complimented by the motormen and conductors who offered to submit their grievances to him as sole arbitrator.

The third novel feature of the strike was the proposition of the strikers to issue bonds to support them in the struggle. It was the intention to issue \$100,000 5 per cent bonds of small denominations, to run for several years. Nothing came of the scheme.

WAS CAUGHT NAPPING.

Rather an odd event occurred not long ago at Asheville, N. C., when Charles A. Moore walked into the office of the Asheville Street Railway Company with a

deputy sheriff and an order of court showing that he had bought the road at sheriff's sale for \$1,281.84. Mr. Moore told General Manager S. T. Brent that he had bought the road and had come to take possession, introducing James G. Martin, whom he had appointed superintendent. Mr. Brent thought the gentlemen were joking, as he had no notification of any sale, but there was no going behind the order of court. The sale was made on a personal injury judgment of \$900 against the old company that had never been satisfied. Few people knew what was being sold when the sheriff was receiving bids.

CAR PLUNGES INTO THE MILWAUKEE RIVER.

Car No. 145 of the Milwaukee Street Railway Company's Russell avenue line, on February 4, plunged off the abutment of the Kinnickinnick avenue bridge into the river, causing the death of the motorman and two passengers. The car was approaching the bridge when the conductor noticed that it was being opened to allow the passage of a vessel. He rang the bell for a stop. The motorman instantly switched the current off and applied the brake, but in vain, for the car continued on its way with skidding wheels and toppled over into the river, crashing through the ice front end foremost. Those of the passengers who were able clambered out of the car upon the ice, the others were rescued by firemen. The conductor and one other man had jumped



from the car before it went down. A view of the car in the river is presented in the illustration herewith. The dead motorman had had twelve years experience on the Russell avenue line, and was considered an excellent employe. The temperature was twelve degrees below zero at the time and he had been on duty two hours. That a stop was made fifty feet from the bridge, as required, is asserted by the conductor and denied by the passengers.

The coroner's jury found that the motorman was negligent in not stopping his car fifty feet from the bridge and in not holding his car under proper control. The jury believed that his lack of caution was caused to a great extent by his exposure to the intense cold, and recommended that cars be equipped with vestibules.



Kohler Bros., Chicago, have resigned the agency of the Eddy motors.

J. M. Jones & Sons, of West Troy, N. Y., have received an order for twenty motor cars from the Troy City Railway Company.

Hugh H. Harrison, of White, Crosby & Co., Baltimore, was in the city. Mr. Harrison is one of the most popular supply men in the business.

Vestibuled cars have been ordered by the Northampton, Mass., Street Railway Company of the Wason Manufacturing Company, Springfield, Mass.

Security fare registers, made by the St. Louis Register Company, St. Louis, Mo., have been put on the cars of the Albany Railway Company, Albany, N. Y., in place of other makes.

The Berlin Iron Bridge Company, of East Berlin, Conn., has been awarded the contract to construct an iron bridge of sixty feet span, at Hartford, for the new electric railway.

Stanley Green, western agent of the Fuel Economizer Company, of Matteawan, N. Y., has recently sold 2,500-horse-power of economizers to the Crystal Plate Glass Company, St. Louis, Mo.

The Farist Steel Company, of Bridgeport, Conn., manufacturer of spiral and elliptic street car springs, is sending out an 1895 calendar. In the center is an illustration of various styles of springs.

The Niles Tool Works Company, of Hamilton, O., is out with an illustrated description of its 24-inch engine lathe, 36-inch car-wheel borer, 32-inch drill press, No. 1 hydrostatic car-wheel press, and 50-inch gear cutter.

The Partridge Carbon Company, Sandusky, O., reports so large a demand for the Partridge self-lubricating brushes that the factory is compelled to run overtime. Most of the large roads use the brush, and speak highly of it.

F. P. Thorp, who has been connected with the Brush Electric Company, Detroit Electrical Works, World's Columbian Exposition and Siemens & Halske, has now entered the engineering and contracting business on his own account. His headquarters are at 1020 the Rookery, Chicago.

A. O. Norton, manufacturer of Norton ball bearing railway and bridge jacks, of all styles, from eight to seventy tons, 97 Oliver street, Boston, has issued his 1895 catalog and price list.

Charles A. Schieren & Co., New York, have issued a handsome catalogue of 72 pages, detailing the merits of their celebrated pure oak tanned leather belting, and lace leather. Many valuable tables, a cipher telegraph code, and modes of transmitting power by belting are shown.

The Eureka Tempered Copper Company of North East, Pa., has recently issued its first illustrated catalogue and price list. Prices are given on nearly all the various makes of commutators and brushes. An index enables any one to find the particular article which he requires.

Morris, Tasker & Co., Philadelphia, have a contract for 500 tons of iron trolley poles for Dublin, Ire., and Bristol, Eng. The exceptionally good facilities and the excellent reputation this firm has for turning out such work, secured this order, which is quite a compliment to American ideas.

J. W. Hoffman & Co., the iron and steel merchants, Bullit building, Philadelphia, are sending their friends an 1895 calendar, which is a harmonious combination of gold and yellow, and contains, on the reverse, reference tables of the quantity of construction material required per mile of track.

B. J. Arnold, Rookery Building, Chicago, has been appointed consulting engineer for the St. Charles Street Railway Company, New Orleans. On February 20 bids will be opened at New Orleans for engines and generators, 750-horse-power, forty cars with motors, iron poles, overhead construction and line material.

Charles A. Sheldon has been appointed general superintendent of the Consolidated Car Heating Company Albany, N. Y., with exclusive charge of the factory and other plants. The company last year increased the number of its customers 50 per cent, and also erected a new building, thereby securing 25 per cent more room.

Garson Myers, president of the Standard Railway Supply Company, Monadnock building, Chicago, is sending his numerous customers a very useful and convenient desk calendar. There is a leaf for each day of the year, with space for memoranda, and it is mounted on a neat iron frame. It is one of the best souvenirs we have seen.

The Wason Manufacturing Company, Springfield, Mass., has just finished off a large number of orders for street cars from Northampton, Conway and Springfield, Mass., and the Hartford, Manchester & Rockville Tramway Company. An order for a Brazilian railway has just been shipped. About forty cars are now under way, and plans are being perfected for a new style of open car.

James M. Denniston has charge of the Chicago office of the St. Louis Car Company, 1064 Monadnock block. His first order was seventy-five side entrance cars for the Detroit Railway, similar to those used in Cleveland. The first delivery will be the 15th of May. Mr. Denniston was for four years with the Westinghouse Company, but latterly has been in the general supply business for himself.

The West End Street Railway Company, Boston, has ordered the Reliable Manufacturing Company, Boston, to equip its special parlor cars with the Cochrane electric heaters. This is considered a compliment to the Reliable Company, as the equipment of these cars consists of the best of everything in the market for comfort and neatness. These cars are used for private parties and are in great demand.

M. B. Austin, 1533 Monadnock building, general western agent for the Safety Insulated Wire & Cable Company, New York, and Holmes, Booth & Haydens, Waterbury, Conn., is mailing a very ingenious Japanese puzzle, which calls attention to Safety and K & K wire. It consists of six sticks, which, when arranged properly, will reveal something of interest to the person who solves it.

Lee & Collins, 239 La Salle street, Chicago, are introducing to the trade an insulating paint known as Collins' compound. Lester W. Collins, whose name it bears, is well known to the street railway and electrical trades, having been identified for years with interests journalistic, in a capacity which gave him an opportunity to learn just what is needed by street railway and electrical men.

The Sterling Supply & Manufacturing Company, New York, is sending its friends a neat match-safe, to hang upon a wall or desk. Manager J. H. Carson has hit upon a bright idea to keep himself in the minds of his acquaintances, and it now only remains for him to invent some way of keeping the safes full of matches and a constant supply of fresh cigars, to become the greatest public benefactor.

At the annual meeting of the Scarritt Furniture Company, manufacturing street car seats at St. Louis, Mo., the following officers and directors were elected: H. H. Curtis, president; S. G. Scarritt, vice-president; Charles H. Scarritt, secretary; and George T. Parker, treasurer; W. K. Bixby, H. M. Blossom, William McMillan, H. H. Curtis, S. G. Scarritt, Charles H. Scarritt and George T. Parker, directors.

H. E. Collins & Co., Pittsburg, sole agents for the Cahall vertical water tube boilers, manufactured by the Aultman & Taylor Machinery Company, Mansfield, O., have sold the Seneca furnaces a 250-horse power boiler, using blast furnace gas for fuel; 500-horse-power for the Philadelphia Gas Company, Kelly Station, Pa.; two boilers, Solway Process Company, Syracuse, N. Y.; and boilers for the new sugar refinery, Havana, Cuba.

The Ohio Brass Company, of Mansfield, O., has recently completed arrangements with I. B. Walker, of the Sioux City Traction Company, for the exclusive right to manufacture and sell his patented specialties, consisting of an improved form of trolley ear, both for straight line and curve suspension, a mechanical trolley splicer, and a trolley harp and wheel. These devices have been thoroughly tested, and their utility has been proved.

The Standard Underground Cable Company will be represented in the west by James R. Wiley, Rookery building, Chicago, succeeding the late Fred E. Degenhardt. Mr. Wiley has been connected with electrical enterprises for many years, including eight years in the Metropolitan Telephone & Telegraph Company. He is a brother of George L. Wiley, who has represented the Standard Underground Cable Company in New York and the east for the past ten years.

Robert Laidlaw, president of the Laidlaw-Dunn-Gordon Pump Company, Cincinnati, was elected treasurer of the National Association of Manufacturers which convened at Cincinnati the third week in January. Mr. Laidlaw was one of the leading spirits in organizing the association, and much of the success of the convention was due to his superior executive ability and untiring energy. The delegation was banqueted at the new plant of the Laidlaw-Dunn-Gordon Pump Company.

The directors of the Standard Underground Cable Company, Pittsburg, Pa., at their meeting January 26, elected George Westinghouse, Jr., president; Joseph W. Marsh, vice-president and general manager; Frank A. Rinehart, secretary and treasurer; and Charles M. Hagen, auditor. Mr. Marsh, who has been re-elected a director, is now entering upon the fourteenth year of his connection with this successful corporation, during most of which time he has been its general manager.

The Genett Air Brake Company, through General Manager Wessels, has just sold an equipment of air brakes for all the electric cars of the new electric line in Bristol, Eng. There will be eight motor cars at the start. This order was placed after sending an engineer to this country and thoroughly studying the work of the Genett brake by personal inspection. This introduction of air brakes on English street railways, will certainly lead to their general adoption on many lines there.

One of the handsomest catalogs received by the REVIEW is that of the Nicholson File Company, Providence, R. I. It is a book of 60 pages, bound in cloth, with costly engravings of all parts of the extensive works, with illustrations of the files, rasps, and tools, which have been used in large numbers, and to the satisfaction of all purchasers since 1864, when the company was incorporated. There is a large amount of information in the book, which may be obtained by writing the company.

The Heine Safety Boiler Company, of St. Louis, has just issued a new edition of its famous catalog "Helios." The book is really much more than a catalog, as the Heine boiler occupies only about one-third of the total 178 pages. The remainder of the book is composed of short treatises on fuel, water, steam, combustion, chimneys, drafts, etc., and many tables of practical every day value to engineers. The book is sent free to engineers and steam users, or those who are particularly concerned in any way with modern boiler practice.

The Falls Rivet & Machine Company, Cuyahoga Falls, O., has bought the entire business of the Chicago Shafting & Pulley Company, together with good will and all other assets. The new owners will continue the business at 10 South Canal street, in all kinds of power transmitting machinery. The stock will be increased and it is proposed to carry at all times a sufficient quantity to promptly meet the wants of the trade. George F. Stambaugh will continue as manager. The company is prepared to submit drawings and plans for complete outfits, especially for electric plants.

The Chicago factory of the Genett Air Brake Company has been transferred to the east and consolidated with their works there. The company has found the operation of two plants at points so remote, to be attended with many disadvantages, and as it is opening up a large foreign trade, it was found necessary to select a point which would be best located for both the foreign and domestic business. While the Chicago plant was large, and equipped with exceptionally fine machinery, the new works will have a largely increased capacity, both in quality and quantity. The new shops are crowded with work already.

The Elwell-Parker Electric Company, of America, manufacturers of heavy electric machinery, Cleveland, O., is building for the Cleveland City Railway Company a 1,000-horse-power direct connected railway generator. It will be driven by a triple expansion condensing engine, marine type, built by the Globe Iron Works, Cleveland. The speed of the generator and engine is to be 110 revolutions a minute. The Elwell-Parker Company writes: "This combined plant is designed to work at an efficiency as high, if not higher, than anything heretofore obtained. The maximum overload capacity of this plant is to be 2,000-horse-power."

R. D. Rowe, who recently resigned the superintendency of the South Chicago City Railway, has gone back to his old profession of engineering, and is now one of the new firm of Rowe & Rowe, located at room 901, 226 La Salle street, Chicago. Mr. Rowe demonstrated that he was an able street railway manager as well as an engineer of the first rank during his term with the South Chicago road, and the fraternity will be the gainer should he ever return to the field of street railway operation. Meanwhile his services as an engineer will be of still

greater value than before his superintendency. In addition to an engineering business, the firm will represent the Compton Electric Service Company.

W. W. Whitcomb, president of the Composite Brake-Shoe Company, Boston, has spent several days in Chicago, with a view to establishing here an agency for the manufacture and sale of composite brake shoes. He has given the King & Andrews Company, founders, at 218 North Union street, the exclusive right to make and sell these shoes in the states of Indiana, Illinois and Wisconsin. For the present this company will also solicit business and supply the wants of the trade south and west of this territory excepting in the Pacific coast states. Other foundries are making these shoes in New England, Philadelphia, Pittsburg and San Francisco. The shoe has a fine reputation and sale, especially on electric street railways, the field to which the company is more directly devoting its present efforts.

The William Sharpe Company, 937-8 Monadnock block, western agents of the J. H. McEwen Manufacturing Company, Ridgway, Pa., has placed an important contract, for two 100-kilowatt Thompson-Ryan dynamos, direct connected to two McEwen engines, 15x16, 275 revolutions, of 160-horse-power each. This plant will be installed in the State Security building of A. M. Rothschild & Co., State and Van Buren streets, whose owners say, will eventually occupy the entire west frontage of State street from Jackson to Van Buren. This is an important sale, as it ushers the J. H. McEwen Manufacturing Company into the electrical field, where it will make itself felt as strongly as it has in the engine business. Mr. Sharpe sold the dynamos, meeting close competition. They will be used for electric lighting, being chosen on account of the close regulation of the engine, and the new and superior points of the dynamo, which was carefully investigated by J. McAuley, the purchaser's electrical engineer. The dynamo has balancing coils in series with the armature, which are said to eliminate armature reaction, giving a maximum amount of work for a small amount of material. The J. H. McEwen Manufacturing Company intends to build larger generators suitable for street railway use.

John W. Baker, Portland, Me., representing the E. T. Burrowes Company, manufacturers of automatic car shades, was a recent visitor to the REVIEW.

M. E. Satchwell, formerly manager of the Seeley Railway, in Montgomery, Ala., has been appointed superintendent of the Montgomery Street Railway Company.

Col. Walter S. Franklin has been chosen president of the Baltimore City Passenger Railway Company in place of the late Oden Bowie, and has resigned the position of general manager of the Baltimore & Sparrow's Point Railroad.

LEWIS & FOWLER MANUFACTURING COMPANY IN RECEIVER'S HANDS.

To many the announcement that the Lewis & Fowler Manufacturing Company, Brooklyn, passed into the hands of Charles G. Dobbs, as receiver was a surprise. The business was started seventeen years ago, by Daniel F. Lewis and J. W. Fowler, and became a stock company in 1883.

It has long been one of the largest street railway supply houses in the world, and manufactured cars, sweepers, trucks, car trimmings, fare registers and a great variety of supplies. It has always stood high in the estimation of the trade, and its hundreds of street railway customers will learn with deep regret of its present difficulties.

Mr. Lewis says:

"The company started a number of years ago in a small way, and entirely by accident. We wanted an indicator in the cars which the conductors couldn't beat. The indicators then in use were no good, and cost the Brooklyn City Railroad Company 10 cents a day each. Fowler and I invented an indicator that filled the bill, and we started a small shop, with five men, to manufacture it. That invention brought us into contact with railroad men all over the country, and we branched out into the manufacture of street railroad cars, and now our factory takes up an entire block. The business became so extensive that I was unable to attend closely to it, and in that way I lost track of affairs until I suddenly discovered that it was bankrupt."

Francis N. Ross, a real estate man, Brooklyn, and holder of sixty shares of stock, alleges mismanagement, and has petitioned the district attorney for a grand jury investigation. In his letter to the district attorney, Mr. Ross declares that the affairs of the company have not been managed as they should have been and that the officers are to blame for the financial condition of its affairs and the present necessity of placing it in the hands of a receiver. He declares that the entire capital of the concern, amounting to \$290,000, has been absorbed and in addition there are that liabilities of about \$200,000 against it.

Mr. Ross says that to his best information and belief the officers of the company paid dividends when the company was, in fact, insolvent. He alleges, also, that false reports of the company's financial condition were sent out and to the state treasurer at Albany. Mr. Ross sets forth as the last report of the company, as filed with the state treasurer in January, 1894, these figures:

The amount of capital stock is.....	\$400,000
The capital stock actually issued is.....	290 750
The amount of debts do not exceed.....	180,000
The amount of its assets is at least.....	479,000

He says that to his knowledge the company met with no heavy losses since this report was filed and he can not see how the company could have failed had that report been correct.

Recently an attempt was made to float \$200,000 of bonds of which \$30,000 was taken, D. F. Lewis, subscribing to \$17,000.

Mr. Lewis says:

"In regard to the declaration that false reports had been sent to Albany; if any such reports were sent, it is because of the representations made by the former president and secretary. We were given to understand that the company was in a much better condition than it was

and had no idea that business was being done at a loss. We were deceived and awoke one morning to find the lightning flashing from a previously clear sky. The trustees were the most surprised ones of all, and I, who was trustee and treasurer and one of the heaviest stockholders, am the heaviest loser of all. I was authorized to start an investigation, with the result that the resignations of President Dollard and Secretary Myers were demanded. Mr. Dollard's was accepted at once, Mr. Myers' not till later. It was then thought that if more funds could be put into the business it would be saved and the mortgage scheme was proposed. If those bonds had been subscribed for as they should have been, the company would now be on a paying basis. I purchased, long after the company's last report to Albany, some 750 shares of the company's stock and paying as high for some as \$180 per share. The average cost was \$175. Such was my confidence in the company's solvency, but I was deceived like the rest, for despite my connection with the company I had not taken an active part in its management. What I will realize from my investment I do not know, but I have every confidence in Mr. Dobbs, the receiver and former manager of the company, and know that he will do everything in his power for all the stockholders."

NEW ASSOCIATION IN NEW JERSEY.

The increase in the number and importance of the street railways in New Jersey has rendered it very desirable to form an association for their mutual benefit, the old New Jersey association having long ago been disbanded. Accordingly, Garret A. Hobart, president of the Paterson Railway Company, on January 8, sent out a call for a meeting to be held on the 18th at the office of the Consolidated Traction Company for the formation of an organization to be known as the Street Railway Association of New Jersey.

At the meeting a constitution and by-laws were adopted and the following officers elected: president, David Young, Newark, general manager of the Consolidated Traction Company; vice-president, G. G. Brown-ing, Camden, treasurer of the Camden Horse Railway Company; secretary and treasurer, William B. Price, New Brunswick, manager of the City Railway Company.

The companies represented were: Consolidated Traction Company, Paterson Railway Company, Paterson Central Railway Company, New Jersey Electric Railway Company; Trenton Passenger Railway Company; Jersey City, Hoboken & Rutherford Railway Company; Camden Horse Railway Company; Camden, Gloucester & Woodbury Railway Company; Newark & South Orange Railway Company; North Hudson County Railway Company and New Brunswick City Railway Company.

THACKER-PLATT.

The marriage of Edward M. Thacker to Miss Bertha Platt, daughter of Col. J. D. Platt, the principal stockholder in the Barney & Smith Car Company, was solemnized February 6, in the First Baptist Church, at Dayton, O., before 500 invited guests. The ceremony was followed by a dinner at the Dayton Club, and a reception at the home of Col. Platt. The bride's father presented her with a house and lot valued at \$20,000, and diamonds valued at \$5,000. Presents from friends, to the value of \$25,000, were also received.

SKATING RINKS AS REVENUE PRODUCERS.

PART III.

Dubuque, Ia., has a successfully conducted skating pond, which is the pet child of J. H. Rhomberg, superintendent of the Dubuque Street Railway Company. Although Dubuque is not in the tropics, the weather was so mild there was no ice until the 3d of January, when there was good skating. Since that time the rink has done very well. The company has put up one cheap little frame building in which the skaters warm themselves, and which also serves as the entrance to the rink. Nominally admission to the ice is free, but each person entering is required to buy two street car tickets for which he pays ten cents. Mr. Rhomberg writes, "If we made a direct charge for skating, we should be obliged to pay a license to the city."

There are about thirty incandescent lamps distributed about the grounds. On Sunday afternoons and evenings and Wednesday and Friday evenings there is music. A band is stationed in an old horse car placed near the middle of the rink and furnished with an old coke stove and five incandescent lamps. The band after tuning up, opens all the windows and both doors of the car, permitting the melody and harmony to float on the cold air. When the piece is ended, without waiting for an encore, there is a scramble to close the windows and doors, and the band warms up for its next number.

Program

FOR THE SEASON.

UNION SKATING PARK

Free to the Patrons of the
Dubuque Street Railway Line.

Music Every Sunday Afternoon and Evening.
Also Wednesday Evenings.

GRAND MASQUERADE CARNIVAL EVERY
FRIDAY EVENING

New Ice Every Day

UNION PRINTING CO. DUBUQUE

BIG SKATING RACE

AT THE

UNION PARK

SUNDAY AFTERNOON.

Grand Masquerade

CARNIVAL,

WEDNESDAY JAN. 16th,
EVENING.

FREE TO THE PATRONS OF THE
DUBUQUE STREET R. R. LINE.

NEW ICE EVERY DAY.

UNION PRINTING CO. DUBUQUE, IA.

Dodgers, similar to those reproduced, are hung up in the cars and thrown about the streets once or twice a week to advertise special attractions. Recently a masked carnival filled the rink to its capacity, about 1,000 persons. It only costs about \$3 a day to maintain the rink, which pays a large return on the investment, only thirty people being required to make it pay expenses.

NOT IN IT NOW.

A reader of the REVIEW, in writing, closes with the following concise and unmistakable statements:

"Am now out of the street railway business. Reason why? Stock company—everybody in it—railroad built—bonds not sold—mortgage—receiver—road sold—suit brought against stockholders—general confusion—beginning of the end."

Henry L. Prather, 1511 Monadnock building, Chicago is now the western representative of the Dornier & Dutton Manufacturing Company, Cleveland, O.

The licensing of motormen is provided for in a bill introduced into the New York legislature. None but licensed men are to be employed. A board of examiners, appointed by the mayor, and serving without salaries, are to examine applicants for a fee of fifty cents, and issue licenses.

PERSONAL.

Mr. and Mrs. George B. Kerper, Cincinnati, are spending the winter in Los Angeles, Cal.

L. B. Hole, Chicago, has been elected president of the West Side Street Railway Company, Kansas City. He succeeds B. S. Coler, New York.

Wesley Wentworth has been appointed superintendent of the Lowell & Suburban Street Railway Company, Lowell, Mass. Mr. Wentworth came from the Haverhill & Amesbury Road.

Henry Schnitger, has resigned as superintendent of the Rock Island Street Railway Company, to go into another business. J. G. Huntoon has been promoted to fill the superintendency and Robert Hill has been advanced to Mr. Huntoon's old position.

E. J. Wessels, general manager of the Genett Air Brake Company, was in the city a few weeks ago, and failed not to call on his friends of the REVIEW. Mr. Wessels is a wide awake and progressive man, who is meeting with the success his efforts deserve.

Governor Brown, president of the Baltimore Traction Company has rewarded his faithful private secretary, J. Clarence Bowerman, by appointing him secretary of the company. He succeeds Elon Von Culin, who has gone into the manufacturing business at Washington.

A. Baumgarten has resigned his superintendency of the Freeport Street Railway Company, Freeport, Ill., to go into other business. Mr. Baumgarten introduced several novel plans during his short experience with street railways, which have been published in the REVIEW.

Herbert W. Pool has been appointed business manager of the National Car and Locomotive Builder. Mr. Pool has a large and favorable acquaintance among manufacturers of railway supplies through his connection of many years with the Railway Age and the Street Railway Journal.

J. S. Hill, formerly general manager of the LaFayette Street Railway Company, has come to Chicago. Mr. Hill has charge of the overhead construction of the West Chicago Street Railroad Company, and will have many new wrinkles in overhead construction to exhibit to his visiting friends.

W. N. Sheaff of the thriving young engineering firm of Sheaff & Jaastad called at the REVIEW office while on a western trip. The firm is receiving many compliments on the character of its work on the Fairhaven & Westville plant at New Haven, Conn. Mr. Sheaff is an extensive traveler among railway plants and is well acquainted with the best practice.

Allan Rogers, who has been superintendent of the Brooklyn Heights Cable Railroad since construction began, is no longer with the company. He is one of the oldest men in the cable railroad business, having been connected with the first cable roads in San Francisco, Denver, Kansas City, Cleveland and Brooklyn.

John N. Reynolds has become western manager of the Railroad Gazette, with an office at 1138 Rookery. Mr. Reynolds through his long connection with the National Car and Locomotive Builder has made a wide and valuable acquaintance with railroad men. He will continue to publish his Car Builders' Supplement.

Hartford P. Brown, after more than two years of successful management of the Beaver Valley Traction Company, Beaver Falls, Pa., in the capacity of secretary and general manager, resigned February 4 at the annual meeting of the stockholders. Mr. Brown has a thorough knowledge of all features of the street railway management combined with great executive ability.

E. Mitchell Cornell, for twenty years treasurer of the Second and Third Streets Railway Company, Philadelphia, died of paralysis. From Philadelphia he went to Baltimore, where he was president of a street railway for seven years. Selling out, he bought an interest in the Chester Street Railway Company, retiring as president to private life, four years ago, when the Union Railway Company was organized.

S. L. Nelson, general manager of the Springfield Railway Company, Springfield, O., is the proud possessor of a son and heir. Although less than three months old, the young man has demonstrated his ability in managerial affairs by the manner in which he manages his parents. It is only a question of time when he will relieve his father of many of the cares, worries and responsibilities that beset the life of so successful a street railway manager.

Charles E. Carr has been appointed general manager of the London Street Railway Company, London, Ont., and is said to be the youngest street railway manager in Canada. Mr. Carr, however, in his capacity as private secretary of H. A. Everett, has had plenty of experience to fit him for his managerial duties. The conversion of the road into an electric line, and its extension on the plan of a radial system with electric branches connecting with outlying suburbs will be done under Mr. Carr's supervision.

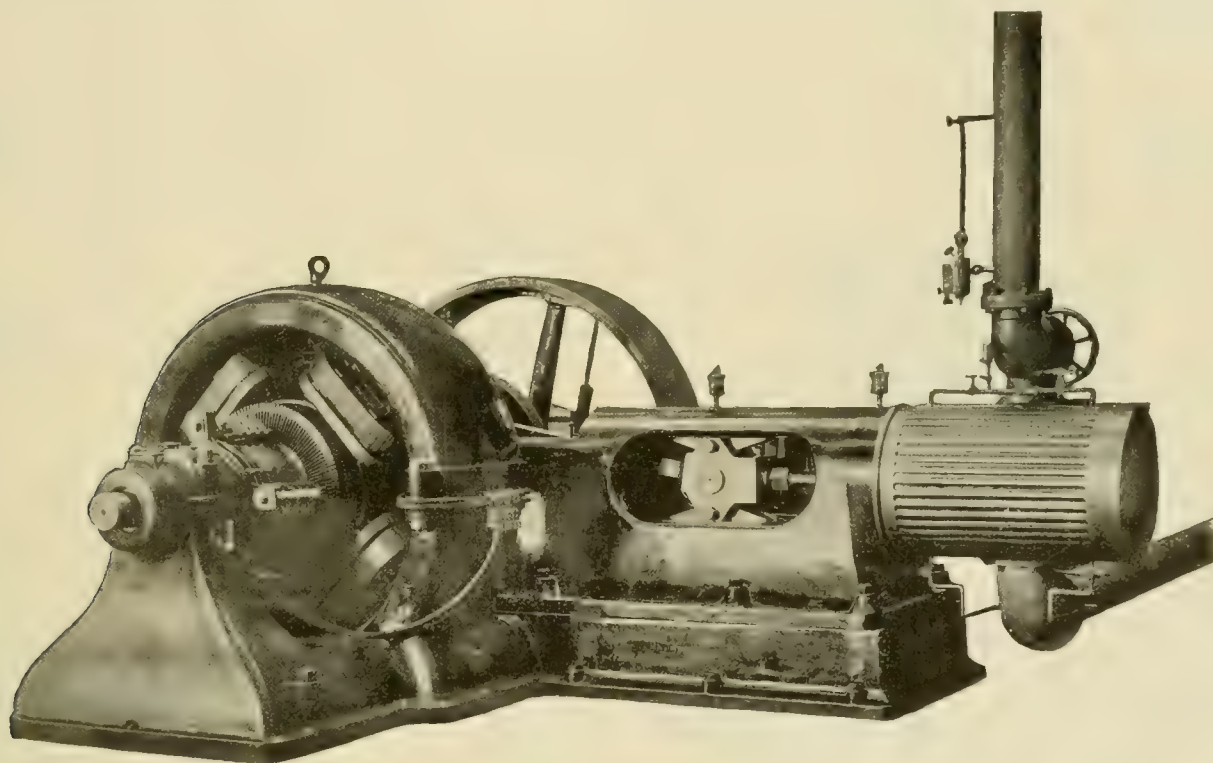
The Binghampton Railroad Company, of Binghampton, N. Y., showed a gain in net earnings of 32¾ per cent for the last six months of 1894 as compared to 1893. The gain in gross receipts during that time was 23 per cent. In these times of reduced earnings it is pleasant to note that some roads have made a gain.

LARGE DIRECT CONNECTED UNIT.

The Akron Street Railway Company, of Akron, O., has recently installed a 300-horse-power McEwen engine, direct connected to a Walker generator. Our illustration shows the generator and engine. The engine is a 19 by 24-inch, making 150 revolutions per minute, built by the J. H. McEwen Manufacturing Company, of Ridgway, Pa., and was selected on account of its close regulation. One additional unit of the same capacity has been ordered. Cars of the Akron Street Railway Com-

CAUGHT ON THE RUSH TRIP.

The original franchise of the Fort Wayne & Belle Isle Street Railway Company, at Detroit, Mich., has just expired. It was granted January 31, 1865, and only three of the many who subscribed to the stock at that time are now with the company. Secretary Goodwin has been with the company twenty years, Superintendent D. S. Hazard and Conductor Henry Helmler each twenty-eight years, while Foreman Joseph Longworth has been repairing its cars for thirty years.



MC EWEN ENGINE DIRECT CONNECTED TO WALKER GENERATOR.

pany are being equipped with motors furnished by the Walker Manufacturing Company, of Cleveland, O., which also furnished the generator.

Three direct connected units of 500 horse-power, of the McEwen and Walker make, have been purchased by the Schuylkill Electric Railway Company, of Pottsville, Pa. Fourteen of the Schuylkill Company's long double truck cars are to be equipped for fast interurban traffic with 50-horse-power Walker motors.

Haley, Cavanagh & Co., 451 the Rookery, Chicago, have been awarded the contract for fifteen miles of the deck of the Metropolitan West Side Elevated Railroad Company, which they are now constructing.

When the electric line at Freeport, Ill., was opened, a rather novel method was employed in educating the public to a high speed. From the first trip cars were run at maximum speed, and the result has been satisfactory. The manager reasoned if he started slowly, and then increased speed, the public would not realize the higher speed, and so be less careful.

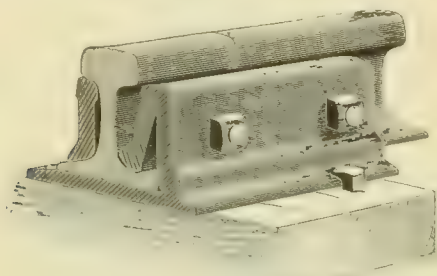
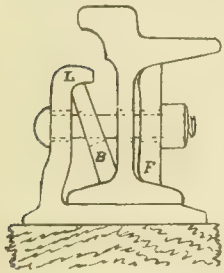
The North Chicago Street Railroad lost 108 cars by fire February 12, in the Lincoln avenue barn. Of these, fifty were open grip cars, thirty of them small, twelve old horse cars and forty-six twenty-one-foot closed trail cars. The machinery was uninjured.

J. P. Clark, superintendent of the West Side Street Railway Company, Kansas City, has resigned, and is succeeded by W. E. Barnhart. Mr. Clark has bought an interest in the Tacoma Traction Company, Tacoma, Wash., and will change the equipment to electric.

Not one person injured, is the remarkable record of the Beaver Valley Traction Company, of Beaver Falls, Pa., for the year 1894, during which 1,155,213 passengers were carried. Equally remarkable is the record of property damage of this company, \$82 for the year. This showing was made, notwithstanding unfavorable conditions of heavy grades, sharp curves, and great length of single track. The management and employees certainly deserve great credit.

THE NILES RAIL JOINT.

Electric, as well as steam roads, have always been to great expense in keeping rails at joints in perfect surface, a thing that is an absolute necessity to an economical management. Several devices have been tried, but the manufacturers of the Niles rail joint claim they have the most perfect, simplest and cheapest. It is made of rolled steel, in three pieces, of any length desired, with two, four or six bolts. The tightening of bolts draws the parts towards the rail and binds the base of L bar upwardly very solidly against rail, by the movement of the brace B towards a perpendicular. The construction is such that the L bar never quite touches the



ELEVATED RAILROAD JOINT WITH "I" RAIL.

rail flange. No loosening of nuts is possible, on account of the elasticity of the truss plates. The first drawing shows the joint applied to a girder rail.

This joint, for elevated roads, is 11 inches long, with two $\frac{7}{8}$ inch bolts. It gives perfect service in keeping a

true, smooth running track. All jar at joint is entirely eliminated, and noise of trains greatly lessened. It is readily adapted for electric bonding, as a copper wire, in combination with the brace bar, will make a permanently efficient bond. Further information can be had from the manufacturers, M. C. & S. S. Niles, Nos. 11 and 13 S. Canal street, Chicago, Ill.

NEW PUBLICATIONS.

Practical Applications of the Indicator, with reference to the adjustment of valve gear on all styles of engines, is a work published by the author, a consulting steam engineer of 25 West Lake street, Chicago. The book is intended for the instruction of engineers who can not make use of the higher mathematics, but who desire to learn something about the use of the indicator. There are, however, few of the more highly educated engineers that can not learn something from its pages. Besides simple instructions for the application of indicators, many types of indicator cards are discussed and the defects in the engines from which they were obtained pointed out. No engineer who is fit to have charge of a steam plant can fail to get good out of the book.

Nearly everything needed by electric street railway builders and operators is to be found in the 1895 railway catalogue of the Central Electric Company, Chicago, which was compiled by D. E. Goe, the general manager of the company. Ten of its 164 pages contain tables and information of special interest to railway constructors.

The Joseph Dixon Crucible Company, Jersey City, N. J., has issued the third edition revised of "Graphite as a lubricant scientifically and practically considered; also, its value as an accessory for engineers and machinists." The book is all that its title indicates.

The American Street Railway Association has just issued volume 2 of the American Street Railway Decisions of the United States and Canada. This is the second of the series which will require six volumes to bring the work down to date. Volume 2 has 483 pages and was compiled by Charles A. Richardson and Alfred J. Hook, who have arranged the cases in chronological order. The book is published for subscribers at \$5 a volume.

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H. H. WINDSOR, Editor. F. S. KENFIELD, Business Manager.

CORRESPONDENCE

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

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WE invite our friends to call upon us in our new offices on the seventh floor of the Old Colony building, where we can promise them a fine view of Lake Michigan, no matter what its mood, and clear, fresh air, in addition to the hospitality we were wont to afford in our old quarters. We have been burned out, which is the cause of any delay that may have occurred in this issue reaching you. Like the fabled garments of olden time, we have come out of the fire with renewed life and vigor determined to do even better for the street railway interests in the future than it has been our privilege in the past.

WHEN "regulating" legislation is proposed, it can often be averted by showing by actual practice what its effect will be.

MASSACHUSETTS street railways desire an act of the legislature, creating conductors special police officers. This is a good movement, as conductors will have the power to control obstreperous passengers, ejecting, or arresting them, if necessary, without the delay of waiting for a regular police officer. Companies which have not taken steps to obtain this power for their men, will find it of advantage.

CROWDING of passengers into street cars can never be prevented by the means that are being taken by the legislatures, which are beginning at the wrong end.

Instead of cutting down fares for those who prefer to stand, they should increase them. If a person can save money by standing, he will stand, in spite of anything that can be done to make him sit, but if he must pay double fare for riding in a car which was filled before he entered it, he will wait for a car with seats.

THE system of platform gates controlled by the motor-man, adopted by the management of the Minneapolis and St. Paul roads is a radical departure from established practice on crowded city lines but is nevertheless worthy of consideration. Speed has been increasing rapidly in the last few years and there has been a constant tendency to add gates and limit the number of places that passengers can enter or leave the car. The Minneapolis plan simply goes a step farther and closes all entrances until the car stops. The plan cannot but prevent numerous accident claims of the most annoying sort and it will not be surprising if many other roads follow the example of the Minneapolis road in the next few years.

As a car barn floor, "mother earth" has only two redeeming features. It is cheap and incombustible. Aside from those two considerations it has little to recommend it, in spite of its too common use. Every competent electric railway man knows the vital importance of neatness and cleanliness in the inspection and repair of electrical machinery. To have men tramping around in loose dirt saturated with grease and covered with oil soaked waste is not conducive to good work or happiness. Small bolts and various other parts drop in the dirt and are never fished out and the barn force is generally demoralized. Paving brick makes a splendid smooth clean floor for those who can not afford concrete, and there is no good reason why the condition of car barns should not be improved in proportion to the improvements and changes that have been made in rolling stock in the last few years.

THE increasing wear of wheels which many managers attribute to a careless use of sand by motormen in order to make quick stops, resulting specially in flat wheels, is deserving of attention by managers. The sand box and the use of sand is valuable, but should be confined to starting under heavy loads on slippery rails and emergency stops, rather than as the regulation thing in the ordinary once-a-block-stop. Our own observation and that of others who have carefully watched the growing tendency of motormen to depend on sand for quick stops, is that the wheel wear is rapidly forcing itself into a serious problem of expense. The solution seems to lie in mechanical brakes and the use of shoes which will yield a better adhesive power than the ordinary iron shoe. The loss of one-half the reasonable life of a wheel amounts to a large item in the course of a year and while it is fine sport for the wheel founders, is death to the companies who have to pull their cars into the shop and replace the flat wheels which often cannot even be saved by turning down.

THE method of protecting pipes from electrolysis as tried at Newark, N. J., and described by Harold P. Brown, engineer for the board of works there, in this issue, is one that will attract much attention. The method is so simple as regards the method of keeping the pipes negative to the earth at all times that it is surprising that it has not been tried before. In addition to describing his plan Mr. Brown criticises severely some remedies that have been tried and while we in common with other electric railway engineers can not endorse all the statements made, the uncomfortable fact remains that the majority of his criticisms of present methods are in a measure true. The criticism of the three-wire system is hardly fair as regards the increase of fire risk, because the high voltage between trolley wires can not cause any more disastrous effects by the falling of other wires than exist at present. Edison's plastic alloy, described in another article by the same author, is, if descriptions are correct, a wonderful and valuable discovery and further developments will be awaited with interest.

By the Freeman case, which was reported in the February REVIEW, attention is called to a weakness in the claim departments of the street railways of the country. While there is an exchange of courtesies between the claim agents of the larger cities, if anything special comes up, there is no system of keeping them informed of cases that might be of value in the future. Had the first company which was bitten by the Freemans, reported the case to an association which should bulletin it to its members, the others would have been suspicious of all cases of paralysis. Such an association should receive reports of all cases where there is a suspicion of fraud, and money would be saved to its members. An association of this character would be valuable in many ways, bringing as it would its members into contact, and keeping them in touch with the experiences of their fellows. An association, with this object in view, should be organized by the claim agents of the street railways, on these or similar lines, as it will prove one of the most profitable associations connected with the street railways.

WELDED rail joints, both by the electric process and cast, have stood the crucial test of an exceptionally severe winter and have weathered the storm with a record even better than the most sanguine expectations dared to hope. So successful has been the test, we feel warranted in pronouncing the practice an accomplished success. In one of the earlier editions of Trautwine the statement was made that joint space between rail ends was not necessary to allow for contraction and expansion. This was eliminated in succeeding editions. For many years the best engineers have religiously stood by the expansion theory and looked on a dissenter as a rank heretic. It is true that with the usual space left at joints longitudinal expansion occurred. Naturally the movement of molecules was in the direction of least resistance. When there is no space left into which to move, the particles

adjust themselves to the new conditions and either a compression of particles occurs or expansion is had vertically and longitudinally, probably both, but without bulging or bending of the rail itself. The endless rail has been a long time coming but it is here now.

JUSTICE BARTCH, of the supreme court of Utah, has delivered an erudite opinion in which he takes the position that, "If the construction of an additional track for a street railway company would be an interference with the ordinary use of the street, and the track privileges of an existing railroad company, are sufficient for the business of two or more companies, they should all be obliged to use them in common; and an injunction to prevent the laying of an additional track may be granted to abutters." The judge bases his opinion on the doctrine that, "The rights of access, light and air, constitute the principal values of such property, and it must be presumed that when lots are sold the grantees purchase them with a view to the advantages and benefits which attach to them because of these easements. The rights of the grantee to their use is precisely the same as his right to the property itself." Notwithstanding this lucid exposition of the doctrine, it is difficult to discover in what way the light and air, or even access is interfered with by even eight rails, which do not come above the surface of the ground. Even admitting, as his honor does, that the city had a title to the streets, and could give franchises, which it did, it is impossible for it to give away something that it does not possess, having previously given a franchise for tracks, and how a new company can compel an old company to permit the use of its tracks under the decision, it is difficult to comprehend. It may be good law from the standpoint of the new company, but it is equally good law, if not better established, that a person cannot be dispossessed of his property, if he is in possession and has complied with all the requirements in order to obtain peaceful possession. The city having given the right to lay tracks, is no longer in possession of the portion of the street occupied by them, and has no right to compel the old company to permit another company to use its tracks.

ELECTRIC SIGNAL LAMPS FOR THE METROPOLITAN ELEVATED.

The Metropolitan West Side Elevated Railroad of this city is to be electric from start to finish. The latest development is the adoption of electric lights for switch lamps, headlights, side lights, tail lights and classification signals of express and way trains. The Dressel Railway Lamp Works of New York are to furnish the lamps. The interlocking switches and switch towers are being installed by the National Switch and Signal Company, of which Henry M. Sperry, Monadnock Building, Chicago, is western agent. For switch lamps the ordinary oil lamp casing is to be used, with the electric light suspended inside. The wires are to be brought up through

the bottom of the lamp and passed over an insulating block in the top, from which the lamp socket is hung. The lamps are to be connected in the usual series of five to be run from the railway circuit of 500 volts. One lamp in each series will be put in the interlocking switch signal tower to serve as a pilot lamp. The tower man will thus know whether his circuits are all right.

ASSOCIATION OF CLAIM AGENTS.

It seems strange that there is no association of claim agents of street railways. While most of the work they are called upon to do is local, there are many features that are widespread and take in other companies in remote cities. Take the Freeman case that was exposed in the February REVIEW for an example. These people worked in three of the largest cities in the United States, yet each claim agent treated it as an isolated case. Had there been an association to bulletin confidential information, the second road, nor the third, nor the fourth road would have been caught by the paralysis fake. There is an interchange of courtesies between some of the claim agents, but it is not as systematic as if an association were formed.

The steam roads are better organized in this respect, having formed the Association of Railway Claim Agents in 1890, the next meeting to be held May 22 at the Galt house, Louisville. Sessions usually last three days, consisting chiefly of discussions on topics relating to details and matters of policy in conducting the claim department. The association has a 120 members, all of whom have received a great deal of valuable knowledge from the association. The objects of the association, as given in the by-laws, are "the discussion of any subject of interest to the lines of railway represented by its members."

In accordance with this provision the following topics that will interest street railway men have been suggested for consideration:

Resolved, That a speedy adjustment of a claim is (not) always most desirable.

Resolved, That loyalty to employer, civility to all persons, and a spirit of accommodation to each other, are principles of the utmost importance, and should govern all of our actions.

Resolved, That relief should (not) be extended to employes injured wholly through their own fault or neglect.

Resolved, That financial relief should (not) be extended to all employes injured under circumstances creating a legal liability. (If any, what relief?)

Resolved, That the duties of the adjusting agent do (not) require him to act in the capacity of a detective.

Resolved, That claim agents should (not) be vested with discretionary authority (to a limited degree).

Resolved, That accident insurance, when held by an injured person, is (not) of advantage in reaching an adjustment of injury claim.

Resolved, That it is advisable (unadvisable) to ignore attorneys in making settlements with claimants.

Resolved, That in case of accident resulting from collision with street cars, the railroad company should (not) deal direct with injured person rather than with an insurance company with which the street car company may have insured against loss for such accident.

Resolved, That the passage of slow-speed ordinances by towns and cities increases (diminishes) the danger of accidents to the public.

In addition to the discussions, the members obtain, in conversation with their fellows, much they otherwise would never learn of details of handling their important department. No man can know it all, but he can come near it by improving his opportunities. The claim agents of the street railways should organize for their mutual protection and that of their companies.

STREET RAILWAY MOTORMEN AND CAR REPAIRS.

BY HARRY F. REYNOLDS.

The subject of street railway motormen and their relative position to the maintenance and repairs on cars, is a subject that the careful street railway manager has overlooked to a great extent. The writer having been connected with the management of a small street railway, determined to keep the record of repairs and their causes and cost, on two new cars that were put on the road. This record covers two years. The cars were put in charge of two motormen, with a first-class man for relief, and there were no other men handling these cars except the three men mentioned. I desire to state here, that of all the accidents and delays, none of them occurred while the relief man was in charge.

Each motorman had been employed by the company for about the same length of time before being put in charge of these cars, but there was quite a difference in the cost of repairs. One car cost \$30, and the other \$450, a difference of \$420, which can be traced to the handling of them. The car on which there was only \$30 expended will be referred to later, and I will endeavor to give the causes of the large amount of expense on the other.

In less than one month this car was run off a 20-foot embankment, precipitating car, passengers, and motorman to the bottom, falling on end, with the passengers, seats, mats and trap doors, intermingled with broken windows, all in one promiscuous mass. The passengers were extricated from their perilous position with only one injured, and by the use of a small amount of cash and a large amount of diplomacy a damage suit was prevented. The end of the car was smashed, besides all the windows being broken. The cost of raising car and repairing was \$100. This accident was caused by excessive speed at a dangerous portion of the track. Shortly after this a new man was put in charge of the car; a bolt became broken, and fell in the motor; before it was discovered the

armature was ruined, which cost \$160. After retaining this man for more than a year the cost of repairs became too high, and a new man was substituted.

He became ambitious in the start, and in a few weeks disputed the right of way with a switch engine at a railroad crossing and came off hors du combat. His car was thrown from the track, with one side demolished and an axle broken; repairs, \$100. In less than two weeks after the car was put on again, one morning when going to the station the motorman informed me that one of his motors was sparking badly. I looked at it, and found a bolt had become detached and torn off the commutator connections of over half of the coils, which were damaged beyond repair; cost of rewinding, \$50. The amounts for these repairs are \$420, which could, with careful management of the car, have been avoided. Each of these cars had the same mileage, 122 miles per day, over the same track. The loss incurred by this car being in the barn has not been calculated.

The man who has charge of the car on which only \$30 were expended has become an ideal motorman. He understands his car, and when he has any time at the end of his run, inspects the motors. If any trifling derangement of the car takes place, he repairs it temporarily, and reports the same at night to the barn foreman. He understands how to start and stop a car, which, I am compelled to say, very few motormen do understand. I desire to say right here, motormen are like poets, "born, not made," and no amount of coaching or instruction can make a man understand how to handle a car unless he possesses the natural knack of acquiring it. Some men learn readily, and others not at all; with some men it is not all incapacity, but indifference, thinking they have learned it all, which is as bad or worse. I would rather have a man who tried conscientiously to do his duty and failed, than one who did not care, and failed through indifference, or over-confidence in his ability.

If any fault was discovered in his motors and he could not locate it, the motorman ran his car immediately into the barn. This man has the company's confidence to the fullest extent, but he receives the same salary paid to the other men, which is unjust. A method which seems to me to be sure of good results is to offer a prize to the man who has the lowest cost of repairs on his car for one year, or ascertain the lowest cost per car, and give each man who had less, a per cent of the money saved. Some method of this kind would result in larger dividends for every corporation.

All facilities for instruction should be given the motorman. He should be made to understand his employer's interest is his, and his car should be kept in first-class running order, which would be to his interest, and when a car was in for repairs an extra man should take the run, the regular man losing all the time his car was in the barn.

How often, when we are standing, clinging to a strap in a loaded car, do we realize that the motorman seems to be scoring up some long contemplated grudge against the company or his passengers, as he starts his car with

a jerk, and stops so suddenly that you have some idea he has just narrowly averted an accident; or when rounding a curve he strikes it so hard that you are precipitated into the lap of some more fortunate neighbor, who has secured a seat! "The much abused public" takes this all as a matter of course, and as one of the necessary evils of rapid transit, but to the company the wear and tear on the car and the machinery is enormous, and this state of things must be remedied out of the dividends of the stockholders.

Another fault that I have repeatedly corrected in many motormen and that many times in vain, is the habit of drawing the brake up as tight as possible against the wheels and allowing it to remain until the car comes to a dead stop. It stops with a jerk, and seems as if it was getting ready to go the other way. It is impossible to make a smooth start when a car is stopped in this way, as it will start with a jerk, with an enormous strain on the armature and gears, and will loosen the keys in the axle gears, causing unnecessary expense and trouble.

The habits of the men should be watched. I never saw a motorman who could be trusted who spent all his spare time in a saloon. Encourage the men to study their cars, and instruct them how to make slight repairs, so as to avoid delays. Never become too familiar with them; correct faults firmly and justly. Always treat your men courteously, and they will respect you. Here is a fact which many forget, and that is, you can get more and better work out of a man who feels kindly toward the company, who thinks his interests are looked after, and that it is not all a one-sided affair. Above all, when you say a thing do it, as there is nothing that loses a man's confidence as doubt in your veracity.

I see that a manager of one of the Brooklyn roads says that he can make a good motorman out of a man of ordinary intelligence in one week. I think if he will look over his accident and repair accounts he will see the fallacy of his statement.

The superintendent who attends to the details of the management of his road is the one who will have the largest dividends to declare at the end of the year, and he will have the respect of his men and the confidence of his company, as the stockholders' confidence will increase with the amount of their dividends.

USE OF SAND IN PHILADELPHIA.

Slippery tracks were the cause of several collisions in Philadelphia the past month. The motormen on the cars of one of the principal lines have been using sand up to a recent date. Owing to the great number of flat wheels caused by its indiscriminate use, it was recently prohibited. Warm weather and a greasy track soon after this order was passed, left the motormen, who had been accustomed to the use of sand, in a helpless condition when it came to making quick stops, and it was owing to the miscalculation of the distance in which stops could be made, that the accidents mentioned occurred. It is

reported that a great majority of the motormen are in the habit of locking their wheels when making an ordinary stop. Stopping a car on a slippery track without locking the wheels, is a fine art, either with or without the aid of sand. The use of sand by untrained motormen is very disastrous, and is sure to make flat wheels. Another company in Philadelphia does not put sand boxes on its cars, but has a special sand car which goes over the lines and sands the stopping places.

LOS ANGELES CONSOLIDATED IS REORGANIZED.

On account of the failure of the Los Angeles Consolidated Electric Railway Company, of Los Angeles, Cal., to pay the interest on its bonds, due September 14, 1894, the bondholders have taken possession under an agreement with the stockholders. The bondholders have agreed to waive the payment of the eighteen months' interest until such time as the finances of the company will permit such payment. They further offer to submit to a permanent reduction of interest, from 6 to 5 per cent, and to take up the floating indebtedness, and make improvements entailing an expense of \$450,000. In return for these concessions, the stockholders have turned over the management of the company to the bondholders, who will retain control until the funds now advanced are repaid, and the railway is on a paying basis.

A PERFECT RAIL BOND.

BY HAROLD P. BROWN.

In the large railway power houses that have been built during the past year or two, every resource of engineering skill has been called upon to secure economy of power. The best types of boilers, of feed-water heaters and fuel economizers are used; the engines are compound and when possible, condensing; the dynamos are direct driven and a high ratio is maintained between the hourly coal consumption and the average electrical output. Yet the result in pounds of coal per car mile is far from satisfactory. The motors are not to blame and the popular series-parallel control has diminished the former rheostat waste in starting and slow running. The fault evidently lies in heavy transmission losses, and yet we are frequently told that the drop of pressure is only 10 per cent. Unfortunately this is not the case, for we again and again find 400 volts at the motor, while the dynamos are at 550, or 27 per cent drop. And practical electric railway men are beginning to realize that this means a transmission loss of 47 per cent. Such losses are encountered almost every day by even the best roads, and are usually the result of bad bonding. In an electric lighting system, the drop in pressure between dynamos and incandescent lamps indicates the total loss in transmission, but in an electric railway line the drop is only a portion of the total loss. When a drop of pressure is encountered at the terminals of an incandescent lamp, its current diminishes,

its resistance rises and it therefore absorbs less energy. In this case a 10 per cent drop means a 10 per cent total loss in conductors. A railway motor with the same drop will at once lower its speed and will therefore require a corresponding increase of current to do the same work. Hence the supreme importance of perfect bonding, for the pressure cannot be maintained if there is a heavy loss at every rail joint. And very few electricians have suspected that there is, in all copper bonding of steel rails, a loss which does not depend upon the cross section, the contact area nor the mechanical perfection of joint. Modern practice in rail bonding ordinarily calls for a generous amount of copper with a rail contact area 7 to 10 times its cross section, and with heavy bolts, nuts or wedges to hold the two metals together. When such a joint is covered with a viscous paint, it would seem to be mechanically and electrically perfect. But careful measurements of the drop in these joints, even when new and at their best, give startling results with heavy currents. The thermo-electric difference between steel and copper evidently causes a loss many times that due to the resistance of the copper alone. But when this joint has been submitted for even a few months to the acidulous moisture of a city street and to the mechanical changes encountered in service, the loss grows rapidly greater. Only a short time is required to deposit a slight film of iron rust between the surfaces of rail and bond. This film is of high resistance and serves as a channel for the admission of more and more moisture and the conductivity decreases rapidly. Every passing car and each change in current aids in the work of destruction.

For several years, experiments have been in progress at the Edison laboratory, with its magnificent equipment for investigation, to obtain a permanent rail bond of low resistance, which would encounter no thermo-electric loss, would make an absolute contact and would be proof against rust and mechanical injury from the hammering of wheels and the changes of temperature and variations of current. Hundreds of promising schemes were tried and found wanting. As has been stated elsewhere, every practical combination of metals, every method of joining, of excluding moisture, of providing for expansion and contraction, has been tested with heavy currents and then buried for the test of time. The contact surfaces have even been welded together, have been machined and scraped to an exact fit, bolted together with heavy pressure, plated with tin or copper, provided with sheet lead, tin foil or other soft metal, or with various non-rusting alloys placed under compression, covered heavily with paint or other water repelling insulation, or a combination of several of these. But a single one of these has successfully withstood the test of time and has proved to be a perfect rail bond. After a test of about four years, on covered rails, it shows no increase of drop and will carry 1,500 amperes. A large number of these joints have recently been dug up for examination and show no trace of rust on the contact surfaces.

In its present form, the plastic rail bond is composed of two portions, a plastic metal compound, which makes

an absolute contact between the rail and the fish plate, and a case to hold it in position between the bolt holes, as near the end of the rail as possible. No holes in the rails are needed, nor any wires, plates, bolts, nuts nor rods, and the completed joint is perfectly protected by the fish plate. For different types of rails, cases of various shapes are used. For heavy girder rails, the case is a flat ring, of specially moulded cork, $3\frac{7}{8}$ inches outside and $1\frac{1}{2}$ inches inside diameter and $\frac{5}{8}$ inches thick. It is treated with a viscous insulating compound which will not oxidize nor crack. With a hook-shaped scraper, or a small emery wheel, the scale is removed from the surfaces on rail and fish plate, where the cases are to be placed. The center of each of these surfaces is rubbed with a special alloy, discovered by Mr. Edison, which instantly changes any iron rust to pure metallic iron and forms a silver-like deposit which repels water and will not corrode. A permanent iron amalgam which has been considered a chemical impossibility, is thus produced upon the surfaces, and in this lies the cause of the low resistance and durability of the joint. One side of the case is then slightly warmed and thus made viscous, and placed upon the prepared surface of the web of the rail. As soon as it sticks, a plug of the plastic metal, surrounded by a steel spring, is put into the hole, which slants downwards towards base of rail so as to retain the free liquid metal in the compound. A second case and plug are similarly placed on the adjoining rail and the fish plate bolted down. The tightening of the bolts compresses the cork to half its former thickness and makes its surfaces stick firmly to the steel, the spring forming a distance piece to prevent too much compression. The fish plate nuts are locked in position, but even if they should slacken and the plate drop back $\frac{1}{4}$ of an inch, the cork will expand or be pulled out to its former thickness, by the adhesion of the insulating compound to the steel, and the plastic metal, by gravity and the expansion of the spring, will maintain a perfect electrical contact. In fact, it is hardly accurate to call this junction a "contact," since the affinity is so great between the prepared surfaces of the steel and the metal of the bond, that it is difficult to separate them, and the conductivity of the joint is practically equal to that of the rail itself. The plastic metal cannot be injured by the blows of passing wheels. It is sealed from air and water and will remain plastic indefinitely, if properly applied. The elasticity of the cork permits the movement of rail and fish plate, due to temperature expansion and contraction. Even though water or any acid or alkali likely to be encountered in the streets, should get to the plastic metal, it cannot effect it nor corrode under the prepared surface of the steel, into which the amalgam seems to penetrate. The remarkable conductivity of the joint and its low drop is shown by the tables below. For cross-bonding or feeder wire connections, a third bond is placed on the rail near end of fish plate and is clamped upon a tinned strip of sheet copper which projects beyond the plate far enough to be soldered to the wire. As this bond has a conductivity equal to the rail itself, a large reduction in feeder wire

can be made by its use. It is cheaper than copper of half its carrying capacity, and will last as long as the fish plate. The saving of motive power from its use may be calculated from the following tables of measurements made at the Edison laboratory in the presence of a number of prominent electric railway engineers. The copper bond tested had the most perfect mechanical contact that could be devised and was perfectly bright and clean. The Weston instruments used had just been calibrated and the readings were made by the visitors. It is evident that no road using copper bond wires can be operated with proper economy of power.

AMPERES.	Copper bond, $\frac{5}{8}$ -inch diameter, with best mechanical contact of ten times its cross section; surfaces bright.	Drop of same due to copper resistance only.	90-lb. Girder Rail, joint with Plastic Rail Bond.	Same with fish plate loosened $\frac{1}{4}$ of an inch.	60-lb. T Rail with Plastic Rail Bond
	Drop volts	Drop volts	Drop volts	Drop volts	Drop volts
50	0.05	0.0025	0.0025	0.0025	
100	0.08	0.005	0.005	0.005	
200	0.15	0.01	0.01	0.01	
300	0.215	0.0175	0.0125	0.0125	0.0167
400	0.27	0.0225	0.02	0.02	0.025
500	0.315	0.03	0.0225	0.0225	0.034
600	0.35	0.035	0.03	0.03	0.037
700	0.38	0.04	0.035	0.035	0.041
800	0.41	0.0475	0.04	0.04	0.05
900	0.45	0.05	0.045	0.045	0.067
1,000	0.455	0.06	0.0475	0.0475	0.075
1,100	0.46	0.065	0.05	0.05	0.083
1,200	0.47	0.07	0.06	0.06	0.091
1,300	0.49	0.0775	0.0625	0.0625	0.098
1,400	0.50	0.0825	0.065	0.065	0.106
1,500	0.515	0.09	0.07	0.07	0.114

BOB TAILED MOTOR CARS FOR NORTH CHICAGO.

It has been a puzzling question with the managers of Chicago cable roads as to how best to handle the traffic on some lines which act as feeders to the cable lines, now that the feeder lines are being changed from horse to electricity. These branch off lines have their cars hauled as trailers on the cable trains, and now that electricity is to be used it will be necessary to haul the motor cars as trailers, transfer the passengers at the cable line, or keep special motor cars to haul trailers to and from the junction with the cable. The latter plan has been decided on for several of the short feeders of the North Chicago Street Railroad, and thirteen cars, to be used as motors only, have been prepared for service at present writing. They are really a kind of light electric locomotive, although handsome enough in appearance not to suggest anything of that kind to the public mind. The bodies are twelve feet long. There are no foot boards, platforms or railings—simply a cab for the protection of motorman and apparatus. The wiring, fuses,

switches and resistance are inside instead of underneath the car. The motorman makes his entrance through a side door. As the company had already its stock of trailers, which was good for several years service, and as the bodies of a lot of Connelly gas motor cars could be made over for cabs, the plan is probably a wise one, as it involves the purchase of no equipment except electric motors and trucks (which would be required in any case), and there is none of the expense of hauling heavy motor cars as trailers on cable trains.

CONTINUOUS TRACK AN ASSURED SUCCESS.

It can now be stated with confidence that the continuous track is commercially practicable. With one exception, all of the many experiments that have been tried with the continuous rail for street railway tracks, have been successful. The one exception was the track electrically welded at Boston, during the summer of 1893. The large percentage of broken joints there, was due to the fact that it was the first electrically welded street railway track laid, and there was at the time much to be learned from experience with electric track welding. On the other hand, among the successful experiments may be cited first of all the one by A. J. Moxham, at Johnstown, Pa., the hot riveted joints laid on the Cleveland Electric Railway, three years ago; the driven bolt joints laid at Newtown, New South Wales, in 1893; the electrically welded track laid last season at St. Louis, Brooklyn and Cleveland; and the cast-welded joints laid at St. Louis. This is to say nothing of the many miles of angle bar joints that have been laid with no provision for contraction and expansion.

Spring is here and the winter, though of unusual severity, has resulted in the breakage of so small a per cent of electric and cast welded joints, that the continuous rail can be called an assured commercial success. Captain Robert McCulloch, manager of the National system at St. Louis, says, regarding the experiments there, that the results of their practical investigation of the question is, that a continuous rail is entirely feasible and practical, either by electric welding or cast joints, that the heat of the summer does not throw the track out of alignment by expansion, and that the contraction by reason of the thermometer going to zero and below, causes so small a percentage of broken joints that they have no fear of trouble on that account. With them, therefore, the question of contraction and expansion will not prevent them from a further prosecution of the work. As soon as the weather permits they will commence the laying of ten miles of 7-inch girder rail. The rails will be rolled in 60-foot lengths, and electrically or cast-welded from one end to the other.

C. W. Wason, electrical engineer of the Cleveland Electric Railway, reports as follows on the continuous track there:

"Out of some three thousand electrically welded joints we have lost but six during the past winter—two on

96-pound rail and four on 76-pound rail. As you know, we have had some extremely cold weather, the thermometer reaching 10 below zero for two or three days continuously. The 1,000 feet of track laid some two or three years ago, with hot riveted joints, is as true and level as when put down, and not one penny has been expended on the repairs of this section of track."

The Chicago City Railway will this spring lay about thirty miles of track with cast-welded joints.

MONTREAL CONVENTION, 1895.

Preliminary preparations have been made for the convention of the American Street Railway Association to be held at Montreal October 15, 16, 17 and 18, four days instead of three as usual. There will be no duty on exhibits going or coming, for entry fee will be paid by the association, as Exhibit Hall will be made a bonded warehouse. The Windsor Hotel will be the headquarters of the association and meetings will be held in the hall of the hotel, which has seats for 1,000 persons and a stage. Victoria rink, opposite the hotel, with 20,000 square feet of floor, has been engaged for the supply men. A reasonable sum will be charged exhibitors for floor space. These arrangements were made recently by Joel Hurt, W. Worth Bean, Frank R. Green and W. J. Richardson. Another meeting of the committee will be held April 10 at the Auditorium, Chicago, when arrangements will be completed.

Great times are expected at Montreal. Granville C. Cunningham and E. Lusher, of the Montreal Street Railway Company, have not completed their programme of entertainment, but are hinting on an English fox hunt as one of the attractions. The Montreal Hunt will furnish the hounds, 80 in number, and they are a very fine pack.

CHICAGO TRADE PRESS ASSOCIATION.

Chicago's class papers have an organization called the Chicago Trade Press Association, which on the evening of March 8 held its fourth annual banquet at the Great Northern hotel. The REVIEW is a member of the association because it realizes the importance of organizations which it has always advocated for the various departments of street railway work, and has found by experience at each monthly meeting that an association is a good thing, which it is wise to preserve.

The tables were in the form of a capital T, and were beautified by many rare and new varieties of flowers furnished by President G. L. Grant, of the American Florist. Following was the program:

WELCOME—President G. L. Grant

THE TWENTIETH CENTURY POSTMASTER—Hon. Washington Hesing, Postmaster, Chicago.

THE TWENTIETH CENTURY TRADE JOURNAL—F. C. Oviatt.

THE TWENTIETH CENTURY WOMAN—Charles Eugene Banks.

OUR POSTAL SYSTEM IN THE TWENTIETH CENTURY; With a Glimpse of its Origin and Progress—Col. J. A. Montgomery, superintendent of mails.

THE TWENTIETH CENTURY ADVERTISING SOLICITOR—E. J. Baker.

TO REGULATE TROLLEY TRAFFIC.

Mayor Schieren, of Brooklyn, has received a report from his advisory committee, which was appointed to formulate rules for governing electric railway traffic. President D. F. Lewis said, commenting upon the report,

"I have noticed that where the front platform is closed entirely it is very inconvenient not only for women, but also for men, to make their way from the car by the rear platform, which is so very much overcrowded, largely for the reason that one exit is unduly closed. Both gates on the rear platform should be left open, and there would be fewer accidents and less inconvenience than if the one on the side of a passing car is closed. A man getting off from the side of a car nearest to the track stands on the step in a place of safety and can see for himself whether or not there is danger from an approaching car. But if he is compelled to get off from a car on the farther side and walk around behind the car he is put in a very dangerous place, in my opinion."

In regard to prohibiting the overcrowding of cars Mr. Lewis said: "This is something not possible for street railroad companies to do and carry passengers for five cents fare. It would result in bankruptcy and be practically a confiscation of all street railroad property. If we could be guaranteed more passengers in the hours when travel is light, the matter of getting more cars might be considered. But it is apt to be forgotten that the rush hour cars are filled only in one direction and that they run back almost empty."

The report follows: After careful consideration of the information thus gained, together with considerable personal investigation of the practical details of the trolley system, we beg to submit the following recommendations for the regulation of the trolley system, which we believe will afford the best service to the public at the least risk to life.

1. The speed of trolley cars should not exceed ten miles an hour.
2. Every car should be provided with a device giving an audible signal when the car exceeds ten miles an hour.
3. Passengers should not be allowed to ride on the front platforms; and both gates of the front platforms should be kept closed when the cars are in motion.
4. The gates on the track side of the rear platforms should be kept closed.
5. Cars on all lines crossing main thoroughfares on which there are car tracks should come to a full stop before crossing. Cars on main thoroughfares must be kept under perfect control and run at a reduced speed at such crossings.
6. All cars should be provided with reliable fenders, which should be approved by a commission of experts.
7. In case of an accident through the negligence of a motorman, the motorman should be held criminally responsible therefor.

8. It being the opinion of this committee that accidents have occurred which have been due to the use of intoxicants by employes, we earnestly recommend that the companies provide at their respective depots comfortable waiting rooms for the men, where tea and coffee may be obtained at reasonable cost.

9. The tracks should be kept sufficiently sanded where needed.

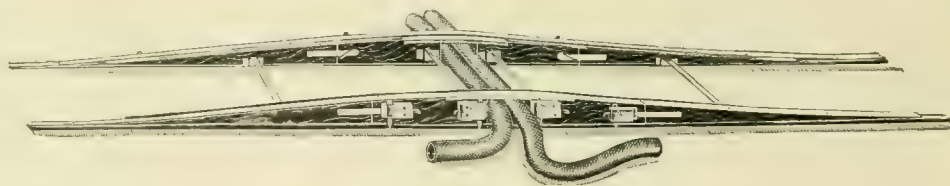
10. As cars are often willfully and unnecessarily obstructed by traffic wagons, we advise that the law that makes it a misdemeanor willfully to obstruct, hinder or delay the passage of any car running on a street railway be rigidly enforced.

11. We consider that the present overcrowding of the cars is indecent and a fruitful source of inconvenience, delay, and danger, and we therefore strongly recommend that the number of passengers carried on any car should not exceed its seating capacity by more than 50 per cent. We are aware that the enforcement of this rule will necessitate an increase in the number of cars, but we consider that the public is entitled to proper and decent accommodation.

HOSE BRIDGES AT FIRES.

The delay consequent upon fires along the line of a street railway when hose is laid across the track is not only a cause of annoyance to all concerned but a loss to the railway in fares. In towns and the larger cities these delays are so frequent that it is desirable to do away with them, even though the cost be considerable.

The portable fire hose crossing which is illustrated in the accompanying sketch is claimed to fulfill all the requirements of such a device. It is made of oak lined with steel, combining the elements of lightness and



strength as well as cheapness and durability. The height at the middle is eight inches and the opening will pass two lines of 4-inch hose. Further particulars may be had by writing the manufacturers, the Portable Hose Bridge Company, of Detroit, Mich.

E. F. DeWitt, of sand box fame, was a frequent caller at the REVIEW office during a recent western business trip. He keeps right on selling sand boxes in spite of all obstacles, and knows not discouragement.

The committee of stockholders of the Long Island Traction Company has recommended an assessment of \$2 per share on stock, a reorganization with new bonds, and a further assessment of \$3 per share. The company needs \$400,000 April 1, and \$100,000 July 1, for rent.

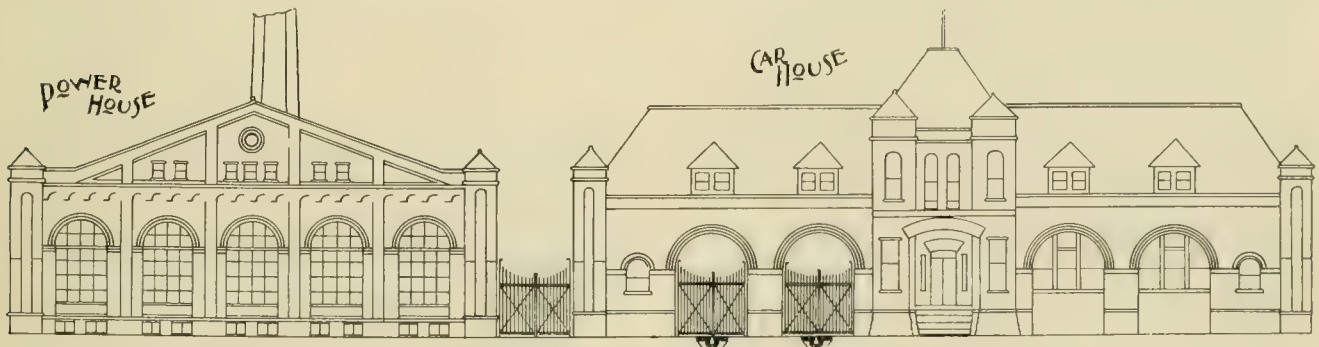
NEW CABLE LINE OF COLUMBIA RAILWAY COMPANY, WASHINGTON, D. C.

In 1871, the Columbia Railway Company, Washington, D. C., was organized, and since that date it has operated a horse car line. For several years the road has given excellent service, having at the same time been one of the most economically operated horse railroads in a large city. Under this management, its business and

track, while the total double track deflection is 101 degrees. Curve radii are from 150 to 250 feet, the average radius being 197 feet.

CAR AND POWER HOUSES.

At the east end of the line are the power house and the car house, fronting north on Bennings road, the continuation of H street, beyond the city limits. The buildings, which are of brick, are separated by a 12-foot alley. The



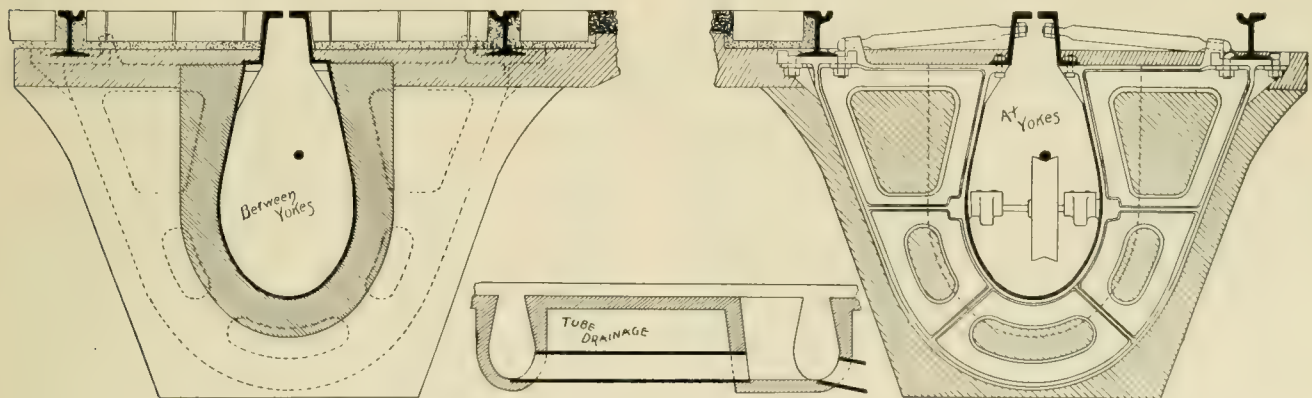
CAR HOUSE AND POWER HOUSE—COLUMBIA RAILWAY COMPANY.

net revenue have steadily increased, until its daily receipts amounted to about \$320 per day on about $2\frac{8}{10}$ miles of double track. The road being now in a flourishing condition, and its future bright, it was decided to change the motive power. The choice, in Washington, seemed to be between underground electric and cable. After due deliberation, cable was chosen. On March 15, it is expected, the cable line will be in operation.

W. B. Upton was appointed chief engineer June 15, 1894. He has been engaged on cable railway work continuously for ten years, in San Francisco, (Market street line), Kansas City, Tacoma and Washington. The Columbia Railway is a double track road, of $2\frac{8}{10}$ miles, extending from Fifteenth street and New York avenue,

car house has a frontage of 128 feet, and is 200 feet deep. In front it is two stories high, the new offices of the company being located in the first and second stories. East of the car house, on the other side of the alley, is the one-story power house, 80 feet front and 200 feet deep. Both houses will be lighted by an electric light plant, which has a capacity of 300 incandescent lamps. In the engine room, etc., arc lights will be used.

There will be two simple corliss engines, 22 inches by 60 inches, made by the Edward P. Allis Company, Milwaukee, which will be run at the rather slow speed for their size, of 54 revolutions. They have the heavy "1890" frame of the Allis Company, and all the latest improvements in details. The nominal power of one of



YOKE SECTIONS—COLUMBIA RAILWAY COMPANY.

opposite the treasury, easterly along New York avenue, Mt. Vernon place, Massachusetts avenue and H street, to and a little beyond the eastern city limits, or from Fifteenth street N. W. to and across Fifteenth street N. E. The road is nearly straight, and practically flat, the steepest grade being about 2 per cent. The short pieces of curve track on the line aggregate 349 feet of double

these engines rated on 80 pounds, cut-off at one-fifth, with 54 revolutions, is 220-horse-power. Their actual power is far beyond the requirements of the road for some time to come, but all parts are proportioned for substitution of cylinders of larger diameter (up to 26 inches) when desired. A Weston automatic engine furnishes the power for the light plant. The fly wheels are 24 feet in dia-

meter, and each weighs 60,000 pounds. The engine foundations are of brick in cement mortar.

The building is surmounted with an octagonal brick stack, 100 feet high, with a 60-inch flue, made in anticipation of a demand for more boilers for an electric extension of the road.

Both cable drums are driven by rope transmission. The 8-foot double rope pinion on the main shaft has grooves for sixteen 2-inch cotton ropes, which drive the 20-foot pulleys on the shafts of the winding drums. The winding machinery is by the Walker Manufacturing Company, Cleveland. The two winding drums are 12 feet in diameter, supplied with Walker differential rings. The power house is also equipped with two Zell water tube boilers, each of 225-horse-power, Jones' underfeed mechanical stoker, Upton patent tension carriage, made by the Walker Manufacturing Company. The tension run is 114 feet long.

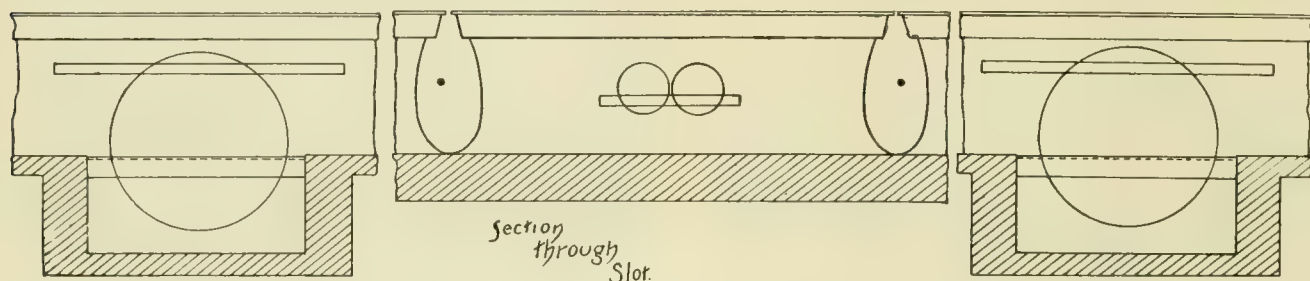
The first cable will be a Lang Lay of the John A. Roebling's Sons Company, Trenton, N. J., $1\frac{1}{4}$ inches in diameter, 30,595 feet long, and will run at the rate of

Guard rail on curves is the Johnson Company's section 92-220, 6 inches high, 92 pounds per yard, with guard $\frac{3}{8}$ -inch above head of rail, and throat less than $1\frac{1}{4}$ inches wide at the gage point. This, when laid to tight gage on curves of long radius, makes a singularly smooth riding curve. The guard of this rail is thick enough to materially prolong the life of the curve rail.

UNDERGROUND WORK.

All joints are channel fish plates, 24 inches long, with six 1-inch bolts, the two plates with bolts weighing 45 pounds. Joints are all staggered and supported on the yokes. At the joints the rail is bolted to the yoke with four 1-inch hook bolts, and at all intermediate rail seats two hook bolts are used, staggering. One-inch National nut lock washers are used on all fish plate bolts, and hook bolts (or chair bolts).

Yokes are of cast iron, spaced 5 feet throughout; straight track yokes, weighing 350 pounds; pulley yokes, 358 pounds; and curve yokes, increased to 380 pounds. The conduit is constructed of Brooks, Shoebridge & Com-



SECTION THROUGH SLOT—COLUMBIA CABLE RAILWAY COMPANY, WASHINGTON, D. C.

$9\frac{1}{4}$ miles per hour. When in place, the total deflections on curve pulleys and 24-inch deflection pulleys will be $232^{\circ} 24'$, and on large sheaves, drums, etc., $1668^{\circ} 17'$; total, $1900^{\circ} 41'$. The rope in place will be, straight, 29,668 feet; bent on curves and 24-inch deflecting pulleys, 760 feet; bent on large sheaves, drums, etc., 167 feet; total, 30,595 feet. The rope mileage will probably be 185 miles per day.

TRACK CONSTRUCTION.

Track centers are ten feet, and the gage on both straight tracks and curves is tight 4 feet, $8\frac{1}{2}$ inches. The top of the slot rail, as also all manhole castings, grip hatches, etc., is flush with the head of the track rail on straight track. On curves, everything is brought to the level of the top of the guard of the curve rail, which is elevated $\frac{3}{8}$ of an inch. Paving on the tracks is of brick, with asphalt between the tracks, having a tothing of brick next the rails.

Track rail is of the grooved girder type, the only one as to flangeway that is permitted in Washington. The section is the Johnson Company's, 6 inches high, weighing 86 pounds per yard, with 6-inch base.

Slot rails are of the Z type, like the section used on the Baltimore City Passenger Railway, and much like that of the Broadway, N. Y., cable line, being the Johnson Company's new section 65-273, seven inches high, 65 pounds to the yard.

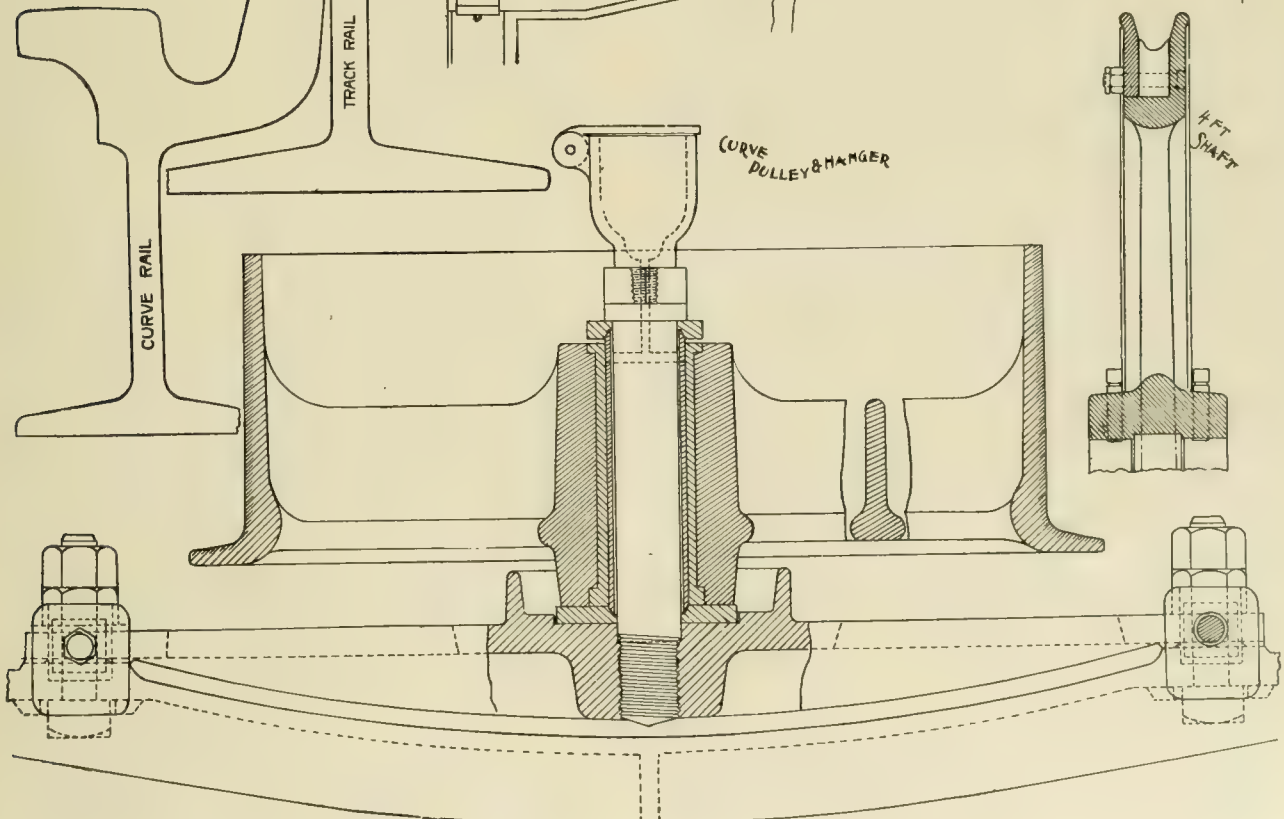
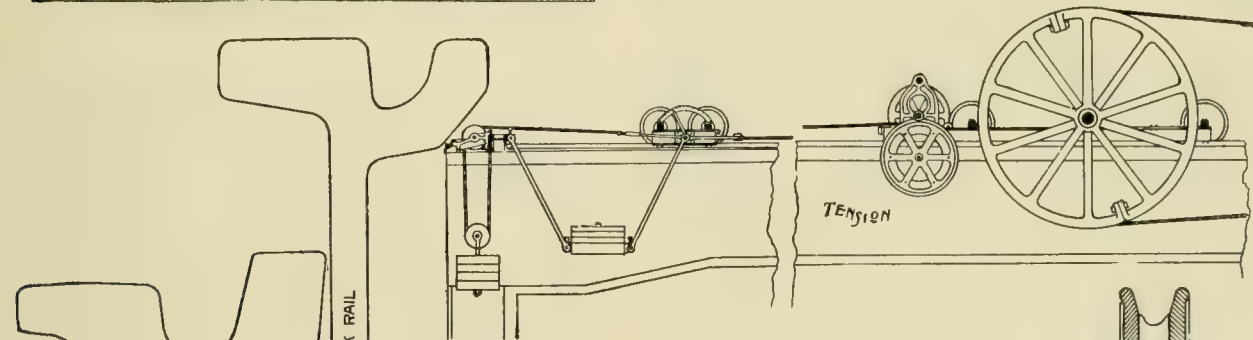
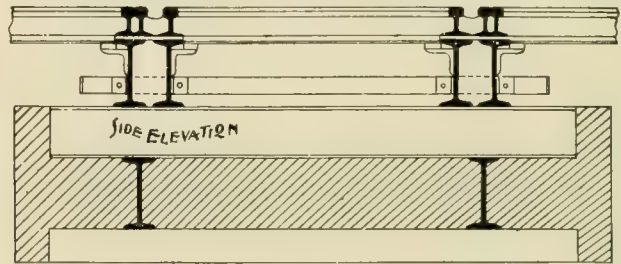
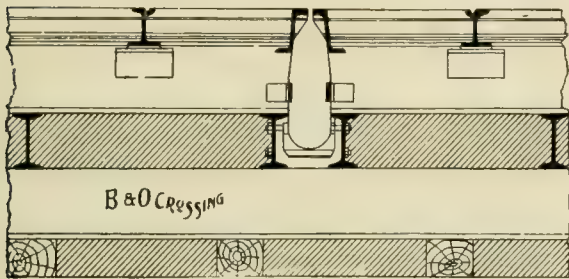
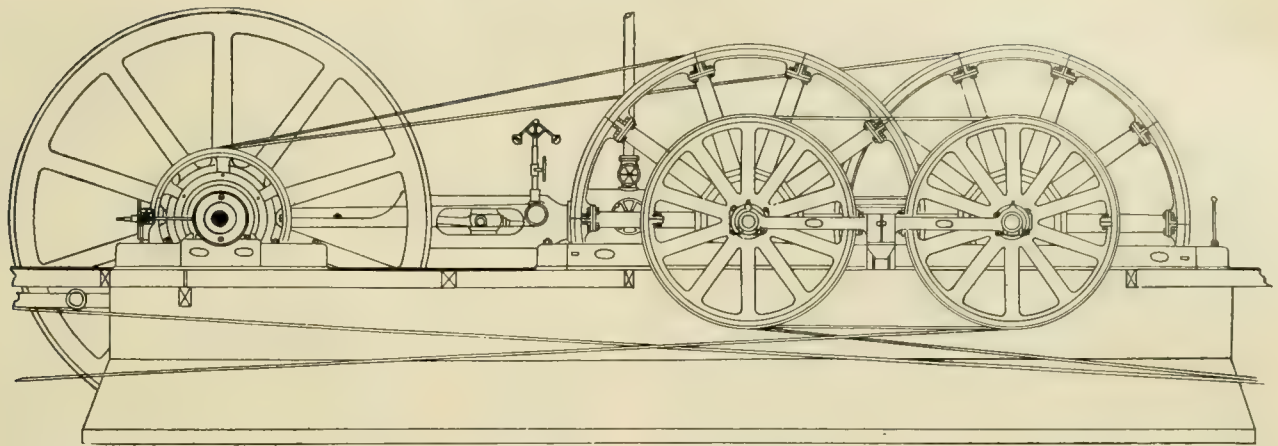
pany English Portland cement concrete. The paving bases are of Round Top cement concrete. The tube is 38 inches deep and 18 inches wide inside, and plastered with Portland cement mortar.

Carrying pulleys are of cast iron, with chilled rims, 14 inches in diameter and $\frac{7}{8}$ -inch spindle, weighing complete, 32 pounds. They are spaced 30 feet, supported in babbitted boxes, which are attached directly to the yokes by T bolts, the heads of which are easily entered into and removed from recesses in lugs cast on the pulley yokes.

Curve pulleys, 24 inches in diameter, $8\frac{1}{4}$ -inch face, with bottom flange, weighing 223 pounds, are generally spaced with 10-foot centers. The curve pulley is loose on the spindle, or rather on a case hardened sleeve which covers the spindle, and can be turned on the spindle, or removed and replaced when worn.

Pit sheaves have trunnion bearings. The two in the main vault are each 12 feet in diameter, and the tail sheave at the terminus, 10 feet. Elevating wheels are 4 feet in diameter, with removable rims, while the depression wheels are standard carrier pulleys with heavier spindles.

There is a cross-over at each end of the line, of the Johnson Company guarantee work, with Harveyized steel at all crosses. There are three surface crossings made by the Indianapolis Switch & Frog Company, and



one by the Johnson Company. Three slot crossings are required, supplied by the Johnson Company, one at a crossing of the Seventh street cable line of the Washington & Georgetown Railroad Company, the other two at intersections with lines of the Metropolitan Railroad Company, which are about to be equipped with the underground electric system. At the Seventh street crossing the Columbia has the under cable.

The road crosses four tracks of the Baltimore & Ohio Railroad, on crossings made entirely of steel, imbedded in Portland concrete, which were made by the Weir Frog Company, Cincinnati, and are good specimens. No other special work or curves is required, except that tracks encircle and enter the car house, which are provided with a shallow conduit for the grip, but not for the cable.

ROLLING STOCK.

All cars will be similar to those of the Broadway line, New York, with 22-foot bodies, and 30 feet long over all. They are mounted on Stephenson trucks, with four 30-inch wheels, 8 feet 9 inches wheel base. There will be at first forty cars, half open and half closed, of which twenty will run from the start. The cars will be run singly, as on Broadway, New York. They were built by the John Stephenson Company, Limited, New York, and supplied with Sterling fare registers, with rod instead of strap.

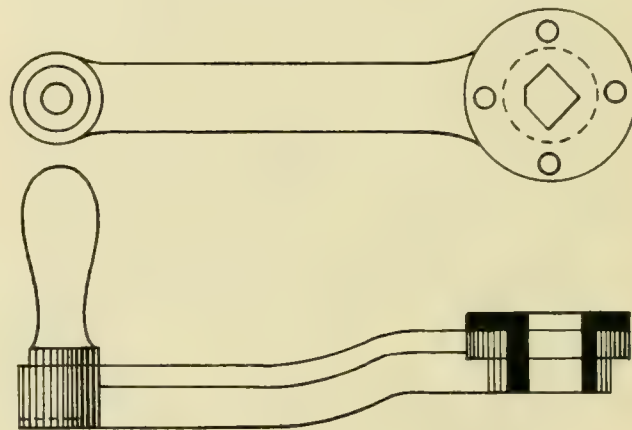
The grips will be single, side jaw grips, supported on the truck in the middle of the car, and operated from either platform by a wheel. An automatic release will operate in case of failure to open at let-goes. Dies will be of rolled steel, eighteen inches long.

The entire cost of road, machinery, buildings and equipment, exclusive only of the land for the buildings, which has long been held by the company, will be under \$465,000, or about \$83,035 per mile of single track. This latest cable road illustrates not only the advance that has been made in construction, but also the cheapness with which a road can be completed, as compared with fifteen years ago. At that time it cost the Chicago City Railway Company \$100,000 a mile for track construction alone, yet the management was certain its work was being done at a low price. The difference between \$83,000 a mile for track, conduit, power house, power house equipment, car house and cars, and \$100,000 per mile for track construction alone, is quite startling. The contractor is Edmund Saxton, Washington, D. C., who now completes his tenth cable railway, which is a strictly modern road, although each of his others was a model of the latest ideas of the time when it was built. All the parts and details are of the best and latest which have stood severe tests and can be depended on.

The illustrations explain themselves, so it is unnecessary to go into details, except with regard to the shaft of the 4-foot elevating wheel. The cast iron follower is sawed into two parts, and the ring, which is steel, is sawed into six parts, to facilitate repairs when worn out.

A BUSHING FOR CONTROLLER HANDLES.

The possibility for improvement on even the smallest details, is well illustrated by the controller handle bushing, devised by J. D. Rostron, chief engineer of the Chester (Pa.) Traction Company, and A. McDowell. The trouble experienced with controller handles by street railway companies is, that the hole in the handle wears



BUSHING FOR CONTROLLER HANDLES.

so that the handle becomes loose and liable to come off, besides making it difficult sometimes for the motorman to tell exactly what he is doing with his controller. When an ordinary handle becomes worn, the only remedy is to throw it in the scrap heap, but with Mr. Rostron's device a bushing is provided which can be renewed at a nominal cost. The first cost of the handle is very little more than that of common handles. There are no springs, lock nuts or catches to get out of order, and once the new bushing is put in, the handle is practically new. It has had a long trial on the Chester Traction Company's lines, and has demonstrated its merit.

CHICAGO-PITTSBURG ELECTRIC.

The Central Ohio Electric Railway, of which P. W. Jones is president; W. M. Koons, treasurer, and J. A. Caldwell, secretary, with general offices at Mt. Vernon, Ohio, "has been formed for the purpose of constructing and operating a complete electric railway system between the cities of Pittsburg and Chicago, for the accommodation of local and through passenger and freight, express and mail traffic, and for the further purpose of supplying light, heat and power to the cities and towns, and to manufacturers."

The president's letter to us goes on to relate the inexhaustible salt wells, stone quarries, potteries, oil wells and coal mines which are to be opened in such plenitude that one almost wonders where room will be found for the right of way. Survey is said to be complete from Mt. Vernon to Marion, a distance of 43 miles. President Jones also states: "The company is quite anxious to start the construction of the line west of Mt. Vernon as soon as the frost is out of the ground."

We trust the promoters of the scheme will not long be on the "quite anxious" seat, but we fear the haulage of such fragile parcels as stone, oil and coal to the States of Michigan, Wisconsin, Minnesota and the Canadas, in paying quantities, by an electric road, is as yet a little premature. We presume the road will connect at Chicago with Wellington Adams' Chicago-St. Louis air line, and so get into St. Louis.

A GOOD RECORD FROM MINNEAPOLIS AND ST. PAUL.

The Twin City Rapid Transit Company of Minneapolis and St. Paul has issued its report for 1894 and it shows a remarkable record for such an adverse year. Although the gross earnings decreased in common with other large systems of the country, the expenditures were reduced so that the net earnings were nearly double those of 1893. The gross earnings were \$2,189,157.20 in 1893 and \$1,981,705.64 in 1894, a decrease of 8.47 per cent. The net earnings after paying all fixed charges were \$116,290.95 in 1893 and \$220,170.09 in 1894, an increase of 89.32 per cent. The record of 1894 figured in cents per car mile from the company's statements are as follows:

General expenses.....	\$.0064
Maintenance of equipment.....	.0108
" " way and structures.....	.0069
Conductors' and motormen's wages.....	.0387
Inspector and transfer agents wages.....	.0015
Conducting transportation—miscellaneous.....	.0095
Cost of running power station.....	.0169
Machine shop expense.....	.0024
Total general operating expenses.....	.0931
Same for 1893.....	.1219
Insurance.....	.0017
Injuries and damages.....	.0112
Legal expenses.....	.0018
Contingent expenses.....	.0015
Total operating expenses.....	.1092
The fixed charges were:	
Interest on bonds.....	.0691
" " floating debt.....	.0027
Taxes.....	.0055
Total fixed charges.....	.0773
Gross earnings per car mile.....	.2073
Earnings over operating expenses.....	.1081
" " fixed charges and operating expenses.....	.0208
Per cent general operating expenses to earnings.....	44.91
Per cent total operating expenses to earnings.....	52.67
Car miles run.....	9,558,648
Decrease over 1893 mileage (per cent).....	7.86

In the electrical department the following is a statement of repairs to equipment:

Repairs to armature per motor mile.....	\$.0010
" " motors " " ".....	.0041
" " cars " " ".....	.0035
Maintenance of equipment per motor mile.....	.0086
Repairs to armature " car ".....	.0008
" " motors " " ".....	.0036
" " cars " " ".....	.0030
Maintenance of equipment " " ".....	.0074

President Thomas Lowry's report throws further light on some of the details and we quote a few extracts therefrom:

"The cost of operation the last year and more especially the last six months of 1894 has fully established a legitimate basis on which to estimate the future cost of operating. The per cent of operating expenses to gross earnings for the twelve months ending December 31, 1894, is 44.91 per cent, against 58.40 per cent for 1893 and 61.28 per cent for 1892. The per cent of operating for the last six months of the present fiscal year is 40.76 per cent, as against the previous six months of 49.57 per cent.

"A careful analysis of our operations to-day demonstrates fully that we can earn 20 per cent more gross earnings with little, if any, increase in the cost of operating.

"The one item that has exceeded our estimates and has been excessive is that of damages. An analysis of the account, however, shows that of the \$106,813.90 expended, only \$36,867.49 aside from the legitimate cost of conducting the department was paid on casualties occurring during 1894. A further analysis of the causes of the accidents shows that a major portion of the alleged injuries and consequent litigation and adjustment arose from passengers getting on or off cars while in motion. This cause is being overcome by placing on all of our cars automatic gates, which will prevent passengers from boarding or alighting from cars until they have been brought to a full stop.

"There is one feature of our system to which I wish briefly to call your attention and that is the interurban line connecting the business centers of the two cities. The corporation limits of the cities of Minneapolis and St. Paul, joining as they do, give our companies, under our present franchises, perpetual and exclusive control of the passenger traffic between the business centers of the two cities. This is a feature that is not common with street railway systems, and one which is not only a great source of revenue, but one which will in the future rapidly improve. The gross earnings of this line for 1894 are \$353,014.80 and the expenses \$128,224.50, or a cost of operating of 36.32 per cent of the gross earnings; the net is \$224,790.30. The gross earnings are 32.76 per car mile run and the cost of operating 11.90 cents per car mile run."

Frank Trumbull, of Denver, Col., who, at the instigation of the stock and bond holders, made an exhaustive examination of both the physical and financial status of the company, says in his report of January 9, 1894:

"The feature of your properties which especially attracts attention at the moment is, of course, the sweeping retrenchment which has been made in your expense account. Naturally, the query arises: Is this decrease of \$400,000 legitimate and is it being made at the sacrifice of the property? My investigations, which have been very careful and in which I have had the benefit of comparisons with other properties, lead me definitely to the conviction that this improvement in the cost of opera-

tions, while certainly strikingly large, is entirely legitimate, and, moreover, that the current figures ought to be maintained with the possible exception of an allowance for increased car mileage, difficulties of winter operation, and, of course, unforeseen calamities.

"An analysis of your retrenchments shows that they are mainly due to four causes, viz:

First. Reduction of wages (amounting to be about 10 per cent in your largest item, viz: trainmen's pay).

Second. Reduction of car mileage, the first five months of 1894 showing 12½ per cent decrease as compared with 1893.

Third. Completion of the rebuilding of car motors. The present force in the armature room and shops indicates what has been done in respect to this retrenchment, and the present condition of your motors warrants you in confidently expecting even less expense from now on.

Fourth. Reduction in number of employes in every department.

"While the total decrease in expenses as suggested above looks very heavy, it is proper to say that the financial conditions of the last few months have made a great deal of this possible, and other companies engaged in similar business have made corresponding reductions.

"The most satisfactory test of all, however, to my mind is the expense per motor mile. I have taken the month of April, 1894, as an average month for operations on your new basis, and find that your expense (including insurance, damages, etc.,) per motor mile run was in Minneapolis 11.07 cents. Comparing the conditions pro and con with operations elsewhere, I can discover no reason whatever why you should not operate your whole system the year through by electricity for 11 cents per motor mile, and I think even less."

The Twin City system comprises 219 miles of electric road and 6 miles of cable. The funded debt is \$12,161,500.

IMAGINE THEY CAN DRIVE MR. SCHIEREN OUT OF BUSINESS.

Of all the nonsense that has been made public by the labor element, the action of the Eccentric Association of Engineers of New York city recently, is the worst. The association which is said to have 4,000 members adopted these resolutions:

"Whereas, The mayor of Brooklyn, Charles A. Schieren, has shown by his official acts that he is in sympathy with the Brooklyn trolley corporations in the fight of our brothers for justice and living wages; and

"Whereas, Said Charles A. Schieren is a large manufacturer of belting in the city of New York,

"Resolved, therefore, That the members of the Eccentric Association of Engineers will do all in their power to prevent the use of belts manufactured by the Schieren Belting Company."

Will Charles A. Schieren & Co. go out of business? Not as the result of these resolutions. Suppose there are 4,000 members in the association, which seems to be eccentric, it is not reasonable to believe that the majority use Schieren belts notwithstanding their well known

excellence. There are too many belt manufacturers pushing for trade for one firm to have monopoly of the business in so large a city as New York. The action is on a par with most of the moves of laboring men, yet it is difficult to understand how such an intelligent class as engineers are supposed to be, should go on record with such a piece of foolishness.

It is the intrinsic merit of the Schieren belts that has brought them in such general use. Their good qualities will continue in them, and the manufacturers are constantly endeavoring to improve them by buying the best known material and using great care in its preparation. If the Eccentric engineers or any other engineers should devote all their spare moments to passing resolutions, they could not change the quality of the product, or the policy of the firm. Any engineer who subscribes to such a resolutions hasn't sense enough to hold his job and ought to be discharged.

PROGRESS OF AIR BRAKES.

Among the recent orders received by the Genett Air Brake Company, New York, was one for forty-three equipments, from Sydney, N. S. W. This order was procured in face of hot competition, and was secured mainly on account of the creditable working of the single air brake equipment the Genett Air Brake Company sent to Australia nearly a year ago. The removal of the factory from Chicago to New York has not diminished the company's business, and since the new plant was ready a large number of orders has been received. Ten brakes were shipped to the American Car Company, St. Louis, and several orders were received from Pennsylvania.

General Manager Wessels has always been confident that the use of air brakes would be made compulsory in this country. The action of the New York State Board of Railroad Commissioners seems to bear out his judgment. One of its recommendations, after investigating Brooklyn trolley accidents, was that the use of air brakes like those used on the Broadway, Seventh avenue and 125th street cable roads, New York, be considered by all managers of electric and cable roads. The Genett is the only air brake used on the cars of those companies, there being more than 125 in use.

Mr. Wessels, while he believes that cars should be equipped with fenders, places more reliance on air brakes, on the principle that it is better to stop the car before reaching a possible victim, than to strike him and bank upon the fender preventing injuries or death. As he pointed out in his Atlanta address, Mr. Wessels says the use of the air brake largely does away with the necessity for a fender.

The Omaha & Council Bluffs Railway and Bridge Company, of Council Bluffs, Ia., has recently elected N. W. Wells, president; C. T. Stewart, secretary; T. H. Millard, treasurer, and W. S. Dimmock, general superintendent.



Interesting Bits of Information from all Parts of the Country,
Boiled Down for Busy Readers.

Guy Curtis has been appointed superintendent of the Lima, O., Electric Railway Company.

Gustave Bischman has been re-appointed superintendent of the Joliet, Ill., Street Railway Company.

The number of people killed by trolley cars in 1894 in Philadelphia was 43. Cable and horse cars killed 24.

Standing in the aisle or on the platform is to be made illegal by a bill introduced in the Massachusetts legislature.

A liberal transfer system has been inaugurated by the Milwaukee, Wis., Street Railway Company. Transfers are given on all lines.

"Keep off the rear platform" has been adopted as a rule for passengers, by the Atlanta, Ga., Consolidated Street Railway Company.

During the first three weeks of the strike at Brooklyn, N. Y., the receipts of the Atlantic Avenue Railroad Company fell off about 80 per cent.

A stationary motor, taking current from the street railway generators, has been placed in a machine shop at Merrill, Wis., to drive the machinery.

Mail deposit boxes for its cars are contemplated by the Milwaukee Street Railway Company as well as the carrying of mail carriers for a stipulated sum annually.

A resolution imposing a fine of \$10 on trolley car conductors for every failure to announce the name of a street or avenue, has been introduced in the city council of Minneapolis.

Fire hose bridges have been added to the equipment of the Citizens' Street Railway Company, Indianapolis, Ind. These permit the car to pass over the hose when laid across the track.

A bill has been introduced in the Michigan legislature, at the instance of the Detroit Railway Company, providing that one street railway company may use the tracks of another company.

A stationary fare register was recently stolen from a street car. The register was out of order and was taken down by the conductor and placed on a seat, whence it was purloined by some passenger. What use the thief could make of it is a puzzle to the conductor, who mourns his loss.

New Orleans' electric roads were given their first severe test during the recent Mardi Gras. The great crowds were handled to the satisfaction of the public and without any interruption in the service. Wreck wagons preceded and followed the carnival procession.

The track and conduit of the Union Cable Company, Kansas City, Mo., which were laid during the boom of 1888, have been torn up by Receiver William Weston, to be sold in the scrap heap, where so many other boom and real estate lines have found their last resting place.

The Clinton, Mass., Street Railway Company, gave up its service on account of the heavy snow storm of February. No attempt was made to clear the track, the management preferring to wait for a thaw. A large four-horse sleigh has been put in service by the company in place of the electric cars.

On the ground that the street railway company is insolvent the St. Louis Trust Company has appealed from a judgment for \$5,000 damages against the Capital Street Railway Company of Little Rock, Ark., of which it is the receiver. This judgment was granted to N. H. Riley for personal injuries.

Freight, mail and express will be handled by the Des Moines, Ia., City Railway Company, under the provision of an ordinance recently passed by the city council. The charge for haulage is limited to \$3 per car; and the company must pay into the city treasury 5 per cent of the gross freight receipts. Steam motors cannot be used.

A bill has passed both houses of congress requiring transfers to be given by the Metropolitan Railway Company and its suburban connections; which are the Brightwood Railway Company, the Rock Creek Railway Company and the Georgetown & Tenallytown Railroad Company, for continuous rides in the District of Columbia.

The Geneva & Waterloo Electric Railway, Geneva, N. Y., has made a good showing during the first half year of operation. Three cars are run over four miles of track under twenty minutes headway. The gross receipts were \$8,218; operating expenses, \$5,839. The average number of passengers was 30,000 per month.

A motorman was seriously injured on the Brooklyn City & Newtown Railroad by a barbed iron wire, which had been tightly stretched across the track over which his car was running. One of the barbs cut an ugly gash in his throat. It was night and he could not see the wire, which had evidently been put up by some malicious striker.

William T. Waller had his ears frozen, he claims, while waiting for a car on the Kansas City Elevated Railway, and has sued for \$1,999 damages. He alleges that he boarded a car, was given a transfer, and told to

walk across the Kaw bridge where another would be waiting. He says he had to wait three-quarters of an hour, without shelter of any kind, before the car got there, and that his ears and feet were frozen while waiting.

"For Ladies Only" on an advertising card in a Cheboygan, Mich., street car called the attention of the public to Prof. So-and-So's lecture. A fool got aboard the car, saw the sign, and thought the phrase referred to the car. So he got out and walked two miles, not wishing to intrude.

The Cohoes, N. Y., City Electric Railway Company, at its annual meeting elected the following directors: Urban Weldon, J. W. Himes, Silas Owen, Murray Hubbard, John Garside, G. E. Simmons, Hugh Graham, E. W. Lansing and Herman Kahn. The four first named were respectively chosen president, vice-president, secretary and treasurer.

Overcrowding of cars at Toronto, Canada, is to be prevented by placing a placard in each car, stating its capacity. The city engineer has recommended that the carrying capacity of ordinary cars be limited to 50 per cent above the seating capacity, allowing 18 inches of space for each person, and that open cars be limited to limited to the actual seating capacity.

L. Jewell, superintendent of time tables for the Chicago City Railway Company, has compiled in convenient form, a booklet of rules and instructions on tickets, transfers and trip sheets for the guidance of conductors. It is issued from the company's own press. The series of transfers has been greatly condensed, eight forms now doing the work of forty-eight previously used.

The Consolidated Traction Company of New Jersey, has divided the supervision of its lines into county districts. E. S. Hibbard will have charge of the road in Essex county, H. W. Fuller in Hudson county, and D. F. Chapman in Union county. These county superintendents will be under the personal direction of Mr. Quigg who has been superintending the entire road,

A case of mysterious disappearance was solved by Superintendent Lawson, of the Tacoma, Wash., Traction Company. A flat car load of wood at the power house was diminishing so rapidly that Mr. Lawson coupled a motor to it and hauled the remainder to a place of safety. When he returned a washerwoman abused him roundly for "depriving the neighborhood of a good thing."

A speed indicator for street cars has been favorably considered by a committee of the Brooklyn, N. Y., city council. S. A. Thompson is the inventor of the device. It consists of a ball governor, which closes an electric circuit whenever a certain speed is exceeded, thus ring-

ing a bell. When a police officer hears the bell he may place the motorman under arrest, on the charge of running his car at an unlawful rate of speed.

The Schuylkill Valley Traction Company of Norristown, Pa., has elected J. W. Shepp, president; D. B. Shepp, secretary and treasurer, and J. H. Passmore, superintendent. The same officers have been elected for each of its leased companies; the Citizens' Passenger Railway Company, the Norristown Passenger Railway Company, the Montgomery County Passenger Railway Company and the Conshohocken Railway Company.

The Middletown, Conn., Horse Railroad is a horse railroad no longer. On December 22, it was placed in operation on the electric system, and has been running ever since without interruption. A 90-kilowatt multipolar generator furnishes the current for the cars, which are equipped with General Electric 800 motors, and K controllers. About a mile of extensions has been built, and more is contemplated. E. W. Goss is superintendent.

The New Jersey legislature passed a bill February 28 providing that none but American citizens over 21 years of age shall be employed as motormen; that new motormen must be examined by a board of three motormen selected from among the employes by the superintendent of the road. In case of strike the directors of a street railway may choose three electricians to examine and license motormen. A day's work for a motorman is fixed at eleven hours, with forty-five minutes for meals.

Our English contemporary, "Money," in commenting on the progress of electric traction there, says: "It required several years of hard work before it was able to overcome the ignorant prejudices of the average traveller. People do not understand electricity even now. Wives trembled lest their husbands should be decapitated by a lift, be blown up by the 'bursting of they wires,' or depart for another world by a path of blue fire. They are now becoming more resigned—through habit, not knowledge. Consequently for electric traction there are brighter days coming."

The consolidation of the Grand Avenue Cable Railway and the Kansas City Cable Railway, which was effected April 11, 1894, has been annulled by the supreme court of Missouri upon quo warranto proceedings begun by the attorney general of the state at the request of the minority stockholders in the Grand Avenue Company. Since the quo warranto proceedings were instituted, several months ago, there has been a change of sentiment on the part of the objectors and it is believed that a new consolidation can be effected with satisfaction to all parties. The ground upon which the consolidation was set aside was that stockholders had not been given the notice required by law.

STREET RAILWAY WHEEL TREADS AND FLANGES.

Is a Standard Desirable?—Is it Practicable?—If so, What Should it be?

PART II.

Some of the best arguments we have heard in favor of a standard wheel come from manufacturers who do not express themselves as in favor of a standard, but who incidentally remark that they have several dozen varieties of chills. By multiplying the number of chills kept in stock by each maker by the number of makers in the

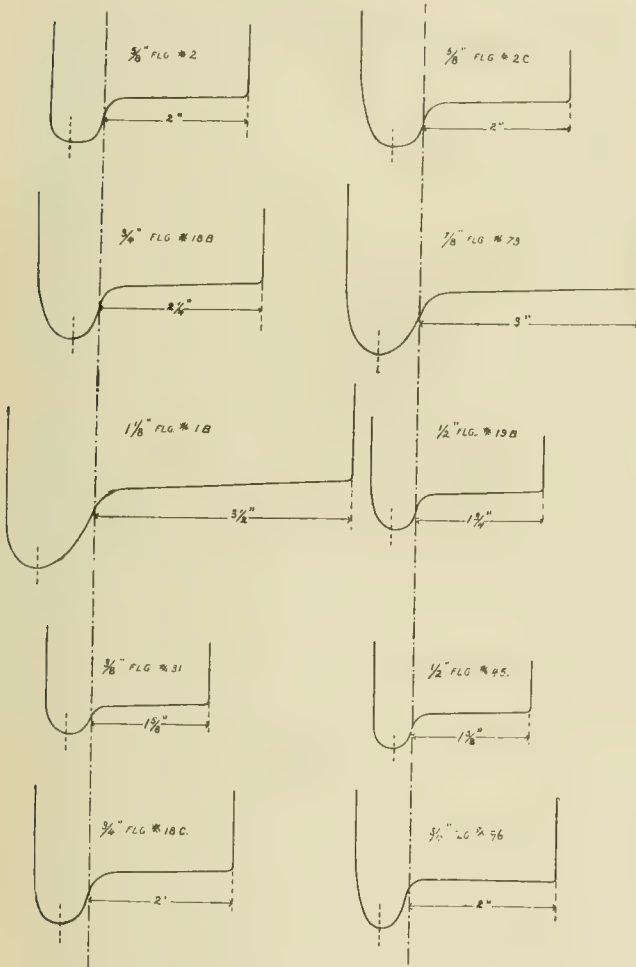


FIGURE 1.

country, we find the number of different wheel treads and flanges in use. We will leave this, however, to the imagination. It hardly seems necessary to go much further to convince our readers of the divergence of practice. We have a few more interesting letters, however, which we will publish.

A. Whitney & Sons: "We hand you herewith, blue prints showing some of the principal flanges used on wheels made by us for horse and cable cars and electric motors. In further explanation, we would say that $\frac{5}{8}$ -inch flange, No. 2, is our usual flange for horse cars; $\frac{5}{8}$ -inch, No. 2A, $\frac{3}{4}$ -inch, No. 18B, and $\frac{7}{8}$ -inch, No. 73,

are those usually furnished for cable cars and electric motors; $1\frac{1}{8}$ -inch, No. 1B, is used under heavy motors running on heavy T rails on suburban lines; $\frac{1}{2}$ -inch, No. 19B, $\frac{3}{8}$ -inch, No. 31, and $\frac{1}{2}$ -inch, No. 45, are for use on tramways (generally with grooved rails), in England and other foreign countries; $\frac{3}{4}$ -inch, No. 18C, and $\frac{3}{4}$ -inch, No. 96, are for electric motor service on such grooved rails as are used in this country. In addition to these flanges, we of course make many others to suit all varieties of rails and service. We, at this time, have chill molds of nearly 100 different shapes, in each of which further variations can be made by changes on flange ring of patterns. In regard to the place from which standard gage is measured, we consider the point on rail at which the flange ceases to touch the rail, the 'gage line' of rail, or 'track gage.' The 'gage line of wheel' we measure at same point on flange. The width of tread of wheel we consider to start at this point in one direction and the thickness of flange in the other. In fitting wheels on axles, the gage of wheels (measured from this point) is made as much less than track gage as the amount of play which may be considered advisable. For electric service, we generally make this play $\frac{1}{4}$ inch. In practice, owing to the different shapes of rail heads, we of course find some elasticity necessary in applying the above rule for a gage line, but on the whole, find it to work very well."

The Lobdell Car Wheel Company makes wheels for motor and cable cars, as shown by Figure 2.

The Dorner & Dutton standard wheel is shown in Figure 3. The gage of wheels pressed by them is $\frac{1}{4}$ inch less than the track on which it is to run.

Another wheel maker, whose name we are not at liberty to give, expresses himself briefly and to the point, as follows: "We have no blue prints of wheels, as they would be of no earthly use. Everybody has his own wheel. The flanges vary from $\frac{3}{8}$ of an inch to $1\frac{1}{8}$ inch in height, and treads vary from $1\frac{3}{4}$ inches to $3\frac{1}{2}$ inches, and in some extreme cases, to 4 inches. These wide variations are, to a great extent, unnecessary, because,

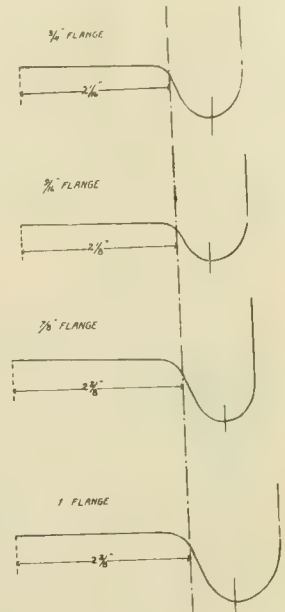


FIGURE 2.

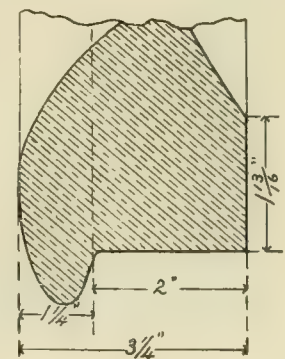


FIGURE 3.

if a $\frac{3}{8}$ -inch flange can be run under favorable conditions, then it is practicable. Possibly under high speed this might be too small, but the writer has ridden from 20 to 25 miles per hour, with $\frac{5}{8}$ to $\frac{3}{4}$ flanges, and lives to tell the tale, and sees no reason why, on anything like a decent track, this should not be height enough. It is in very general use, and in comparison with the standard $1\frac{1}{8}$ -inch flange of steam roads, with the center of gravity of the locomotives up in the clouds, the $\frac{3}{4}$ -inch is certainly sufficient on a street railway. In regard to width of tread, 2 inches is enough on fair track. Of course if track is far enough out of gage, a 6-inch tread might be necessary. I would like to know what others have to say on the subject."

Another company, which desires its name withheld, says: "While we appreciate that if a M. C. B. standard in everything relating to street cars prevailed, in some such manner as in railroad practice, it would simplify matters very much for all manufacturers, we are free to say that difficulties seem to present themselves against a street car standard, which do not exist in railroad matters; and, further, it is not our province to be in a position of submitting to the railroad companies what they should use. It belongs more to us to supply them with what they want, seeing that they best know what will correspond to the service on their roads, which often differs very widely in its conditions."

Having finished the manufacturers' side of the story, it is fitting to hear from the users of street railway wheels, who are, after all, the interested parties. Among street railway engineers, perhaps none have given the track and wheel department more attention than John A. Beeler, constructing engineer of the Denver Tramway Company. The following are his ideas on the subject:—

"Once upon a time the prevailing idea in regard to new shoes was that they must be 'broken in' before they became fit or endurable for use. The shoemaker made them with very slight regard for the shape of the pedal extremities, leaving the luckless wearer to do the rest, which he did by either 'breaking in' the shoes or 'breaking up' his feet.

"So most car wheel makers are doing to-day. The wheel must get more or less wear in order that the tread may properly fit the head of the rail. The wheel must be 'broken in' which means a partly worn wheel before ready for real economical service. This wear of adjustment represents a great loss of energy and many pounds of fuel.

"A standard wheel tread means a standard rail head. One cannot do successfully without the other. The tread should fit the rail when new, and should cover the head without overlapping it. If the rail head is rounded on top, the wheel must be made with a concave tread, or must be worn so, before a perfect contact is obtained. To cast a wheel with such a shaped tread is impossible, and to 'turn' it down expensive. If the head of the rail is beveled, the wheel should be 'coned' in the same proportion. With the level or flat rail head, the wheel tread should be flat, and parallel to the axle. The last form

seems the best in the writer's estimation, although a wheel with a flat tread is somewhat more difficult to cast than a coned one.

"The chief objection that has been urged against a level headed rail is that it will cover with dirt more readily than the other forms of rail, rounded or beveled. This will not hold good, since to give the rail such a shape that it would shed the dirt would be an impossibility, without destroying the usefulness of the rail. The points in favor of a flat treaded wheel seem to outweigh the slight disadvantage in casting them. This wheel has the same circumference at every point of the tread, while the coned wheel has a varying circumference, the largest being just next to the flange and the smallest at the inside of the tread. Any slight inequalities or variations in the track will shift the pair of wheels to the larger circumference of the one and the smaller circumference of the other, thus giving the axle a continual twist, the wheel of the greater circumference in contact with the rail being retarded by the other, or vice versa, the other, of lesser circumference, in contact, being urged forward by its mate.

"The flange must be adapted in a greater or less degree to the form of construction, and style and system of pavement. Where grooved girder rails are in use, the flange must be regulated according to form and dimensions of groove.

"The matter of adopting a general standard is a good one and will make a great saving in the cost of production of wheels, but it is something that must be proceeded with very cautiously. Where already many miles of permanent track exist, of a great many varieties of rail and general construction, it seems impossible to make a single standard to fit these different forms of rail and give economical service, but a start can be made by adopting a standard rail head and wheel tread at the same time, and having all new track constructed accordingly. And let all old track, when reconstructed, be to the standard, and before a great many years the standard form of construction will become universal."

London, Ont., is the center of two radial railway projects. One company is the London & Western Ontario Company, at the head of which is H. A. Everett, and the other is the London Radial Company, composed of John Patterson, John Bland, J. S. Pearce and others.

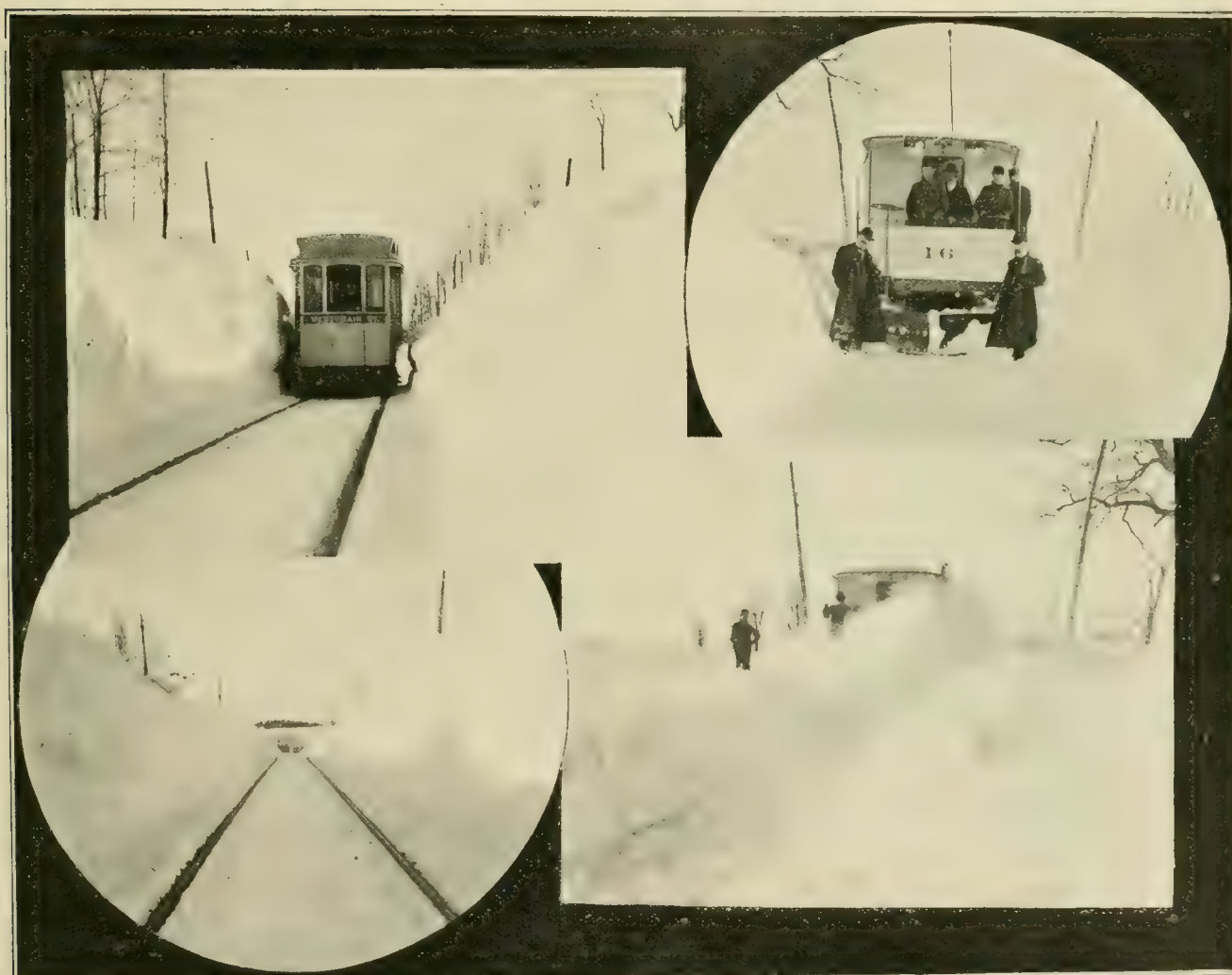
The Detroit Citizens' Street Railway Company has let the following contracts: Two 1,000-horse-power engines to Edward P. Allis Company; 4 batteries, 2 boilers to the battery, 250-horse-power boilers, Babcock & Wilcox Company; 2 1,000-horse-power generators, Siemens & Halske Company; 50 motors, Steel Motor Company; 4 Hoppes purifiers; 50 Du Pont trucks, the Johnson Company; Murphy stokers. The officers are: Tom L. Johnson, president; J. C. Hutchins, vice-president and treasurer; A. B. Du Pont, general manager; J. H. Fry, superintendent.

CONQUERED THE SNOW.

It will interest street railway men to examine these views, showing how snow was conquered by the energetic general manager, W. B. Rockwell, of the Middletown-Goshen Traction Company, Middletown, N. Y. The fighting was done by a combined baggage and express car made by the St. Louis Car Company, St. Louis, and remodeled as to plow attachment in the shops of the street railway company. It is equipped with 4 W. P. 50 motors, having two controllers on each platform. E. G. Wightman,

agers would care to see as much snow on their lines as is shown by these views, and will congratulate the management of the Middletown-Goshen Traction Company on so successfully coping with it.

The Detroit Railway has awarded additional contracts to Sales Brothers, Detroit, representing a Pittsburg firm, \$30,000 worth of iron poles; Benedict & Burnham, Bridgeport, Conn., \$45,000 worth of copper wire, and the Ohio Brass Company and H. W. Johns Manufacturing Company divide a \$3,000 contract for overhead switches and line hangers.



HOW THE MIDDLETOWN-GOSHEN TRACTION COMPANY FOUGHT THE SNOW.

the secretary of the company, writes, "It gets there every time."

In the February REVIEW was a description of the Middletown-Goshen system. The views presented on this page show "how the blizzard of 1895 left us," as Mr. Wightman says. They give an idea of the great snow drifts in the cuts between Midway Park and Goshen. One of the photographs is a snap shot taken just as the plow struck a drift, and the effect of the attack. The others might be described as "after taking." Few man-

JOHN HARRIS CELEBRATES.

John Harris, superintendent of the Cincinnati Street Railway Company, recently celebrated his 54th anniversary, not as superintendent of the company, but as a mortal on this mundane sphere. He had for his guests a large number of conductors and motormen who had worked hard during the severe stormy season of January, and it was to show his appreciation of their services, that Mr. Harris gave them a dinner on his birthday.

DIAGONAL CROSSINGS NOT PARALLEL.

Judge Parker has dissolved the temporary injunction restraining the Colonial City Electric Railway Company from crossing the tracks of the Kingston City Railway Company, at Broadway, Kingston, N. Y. The Colonial company wished to connect its line on Cedar street with that on Thomas street, and, as neither street crosses Broadway, it was necessary to lay 135 feet of track diagonally on Broadway, crossing the tracks of the Kingston City Railway Company. The latter objected, on the grounds set forth in the following section, 102, of the railroad law:

"No street surface railroad corporation shall construct, extend, or operate its road or tracks in that portion of any street, avenue, road, or highway, in which a street surface railroad is or shall be lawfully constructed, except for necessary crossings, without first obtaining the consent of the corporation owning and maintaining the same, except that any street surface railroad company may use the tracks of another street surface railroad company for a distance not exceeding 1,000 feet, whenever the court, upon an application for commissioners, shall be satisfied that such use is actually necessary to connect main portions of a line to be constructed as an independent railroad."

Judge Parker said it was clearly the intention of the legislature to protect a street railroad, not from general competition by other street railroads, but from competition on the same street. The railroad act was passed to facilitate, not to obstruct, railroad enterprises, and this fact should be borne in mind in construing such of its provisions as contain limitations intended for the protection of existing roads. That the object of the provision is to protect an existing railroad from loss by competition on and along a street upon which its railroad is operated, and not to subserve a general public interest, is shown by the fact that if the railroad in occupation consent, the would-be competing railroad may parallel its lines to any distance.

The act expressly authorizes crossings to be made, and as it does not provide that the crossings shall be made at a right angle, or at any given angle, it would seem to be within the limits of a proper construction of the statute, to hold that a crossing may be made at any angle which the peculiar situation of the streets may require.

A different situation would be presented if, for any part of the distance the lines should parallel each other, for then the railroad in occupation would likely have a right to insist that for such distance its tracks should be used, and be compensated therefor. But in this case the distance is so short that the defendant has no use for the plaintiff's tracks. It cannot possibly compete with plaintiff for business on that street, for no one would get on the cars at Thomas street to ride diagonally across the street to Cedar, the two being separated by a distance of only 135 feet, and defendant does not propose to parallel any portion of plaintiff's line, but to make an oblique crossing from Thomas street to Cedar.

If the distance between Cedar and Thomas streets was so much greater than it is as to prevent crossing at an angle for the entire distance, but under 1,500 feet, the defendant could not be prevented from connecting its lines of railroads at those streets, but to accomplish such results it would be obliged to acquire the use of plaintiff's tracks in the manner provided by the statutes. But owing to the short distance between such streets, and the extreme width of Broadway at the point of the proposed crossing, it is neither necessary nor desirable to use plaintiff's tracks nor parallel them, and, therefore, it would seem that the defendant proposes to make such crossing as a reasonable construction of the statute authorizes.

TERRE HAUTE ELECTRIC LIGHT FIGHT SETTLED.

For the first time in the United States the question has been raised and adjudicated, where one electric light company claims danger, injury to wires, poles, etc etc., by the crossing of the wires of another company. The Terre Haute Electric Light and Power Company began proceedings for an injunction restraining the Citizens' Electric Light and Power Company from erecting poles and wires. One of the claims was that the 5,000 volt current of the new company would ruin the old company's 2,500 volt dynamos, and an attempt was made to keep the new company from going on the same side of the street, or placing its wires above those of the old company. The Citizens' company secured a contract of lighting the streets away from the old company, which led to the injunction proceedings.

Judge Henry, of the Superior Court, denied the application for an injunction, sustaining every point raised by the Citizens' company, of which Russell B. Harrison is president. The judge says: "In law the party having the contract with the city to furnish public lights for the streets and alleys, has the implied right to the use of the streets and alleys, in complying with such contracts, superior to any right which any corporation or individual can have in furnishing commercial or domestic lights. This must be so, for the reason, that in law, public rights are superior to private rights."

The court decided that it was unnecessary for the new company to condemn the right to string wires over those of the old, because cities have the right to do their own lighting without such condemnation, and it follows that they have the right to delegate such powers to a contracting party. Therefore the new company would have the same right without condemnation that the city would have to set its poles at the most convenient points for lighting the streets, by the most direct, cheapest and practical route. "It must be understood," the court said, "that a party that goes into competition and bids for public lighting and secures the same by making the lowest bid, as they are generally secured in this way, must have the undisputed right to use the streets and alleys, to set poles and string its wires thereon in order to carry

out said contract. That is one of the elements of the bid, otherwise the party that had the former contract would hold on forever, and the public would be helpless and without the power to displace them and secure a lower bidder."

The Citizens' company showed by expert testimony that if the electrical circuit of both companies was properly constructed and maintained, and should the wires of the two systems come in actual metallic contact, there would be no interference with either circuit, and no injury or damage to the appliances of either, notwithstanding one is of a voltage of 2,500 and the other 5,000. And even if one of the Citizens' company's wires should break, the current would immediately cease and would not be re-established. The court decided that it could not presume that the Citizens' line would be negligently constructed and negligently maintained, but that the city council should regulate by ordinance which company should furnish brackets, insulators, etc. Because the lines cross, the court could not grant the injunction on that ground alone.

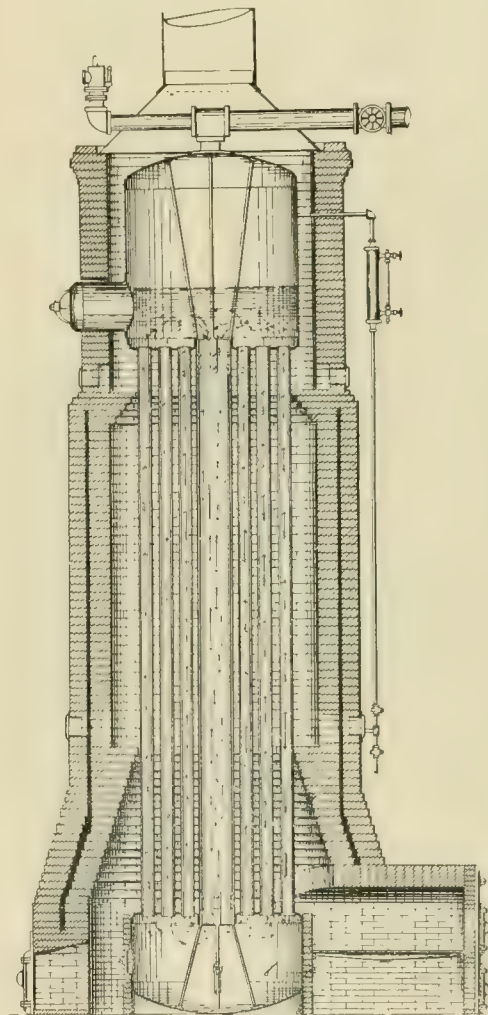
As a matter of fact the wires of the new company will be from five to ten feet higher than those of the old company. This is an important decision to street railways contemplating entering the electric light field.

COOK WATER TUBE BOILER.

Energies of boiler manufacturers are bent towards designing and manufacturing boilers that will not collect scale, which has always proven so disastrous to steam generators. Marked improvement is being made also in the vertical type of water tube boilers, which are receiving marked attention from buyers of steam plants. The Cook water tube boiler, manufactured by the J. C. McNeil Company, Akron, O., is of the vertical type, and is set in brick work as shown in the illustration. The manufacturer has aimed to utilize to the largest degree the heat applied, and to secure the most complete circulation, which is accomplished by having all passageways perpendicular to a direct line to the circulation of water, with no curved passages, thus leaving a clear direct opening from top to bottom of the boiler. The manufacturer says there are no flat or horizontal surfaces that sediment can accumulate on, except the bottom of the lower chamber, which is below the effects of the fire, at the same time being a chamber so arranged that water is at all times in circulation. "The outer tubes," he says, "being the thinnest material containing the smallest body of water and exposed to the greatest heat, causes the circulation to be upward through these outer tubes and downward through the large flue in the centre in which is a larger body of water, and protected from the fire by the surrounding tubes, thereby gaining complete and positive circulation from top to bottom, with separate passage ways for upward and downward currents of water.

"The upper chamber is incased in brick work so that there is no radiation of heat, but, on the other hand, it

acts as a superheater by which the steam is brought to the maximum of dryness. The tubes are so arranged that they can be taken out and replaced very quickly, if necessary, the holes in the tube sheet of the upper chamber being made $\frac{1}{8}$ inch larger than the tube, having copper ferrules so that when tubes are loosened for the purpose of removal, the lower end will cant over far enough to allow them to be slipped down the side of the boiler



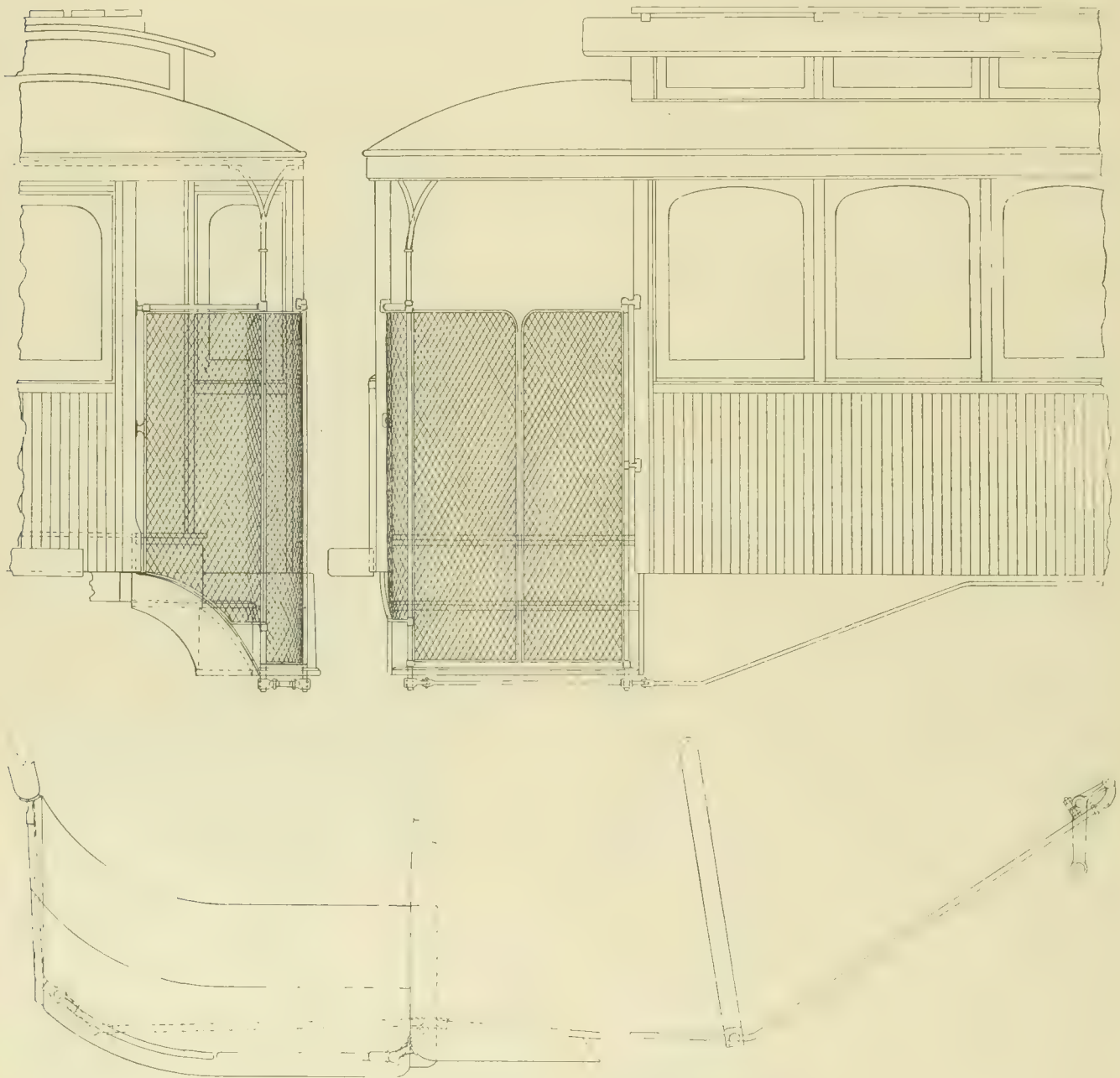
COOK WATER TUBE BOILER.

and passed up between the brick work and the outer side of the upper chamber. Where there is bad water under which conditions other boilers have failed to work, becoming clogged up with hard, tenacious scale, the Cook water tube boiler has run continually, showing scarcely any deposit of scale upon the tube or sheets, the refuse substance being preserved in the form of mud in the lower chamber where it is easily blown off." Many of the largest steel mills use this style of boiler and it is giving satisfaction. The boilers are completed at the works, which saves the expense of sending men to erect them, and enables the manufacturer to make low prices. The company says it is specially adapted for electric street railway plants and wherever high pressure and dry steam are required.

SAFETY GATES AT MINNEAPOLIS.

Determined to put a stop to the large per cent of petty accidents due to people getting on and off cars while in motion, W. J. Hield, general manager of the Twin City Rapid Transit Company, of Minneapolis and St. Paul, has been equipping the cars of those lines with a new system of safety gates as rapidly as possible. These

or getting on the car until allowed to do so by the motorman. They must not occupy, when closed, any space on the platform which might otherwise be occupied by passengers, and when opened, must not hinder the loading or unloading of cars. The gates must be operated by the motorman on signals from the conductor, without danger to passengers who are about to leave or enter the car. To fulfill these conditions, a double swing gate,



SAFETY GATES AT MINNEAPOLIS CONTROLLED BY MOTORMAN.

gates are opened and closed by the motormen on signal from the conductors. They cannot be opened except from the front platform. Before designing these gates, the following conditions were laid down, to be complied with. They must be operated without any loss of time, the cars to run on the same schedule as without gates. They must effectually prevent any person from leaving

opening outward, is employed, and the posts are placed as near the outer edge of the steps as possible. The posts are carried by the steps and by brackets fastened to the body of the car. The dimensions of the gates for the 40-foot vestibuled cars are 21 inches by 5 feet, 4 inches. For smaller cars used by the company, the dimensions are 15½ by 4 feet, 2 inches. They are con-

structed with channel iron frames, ($\frac{7}{8}$ -inch for the large, and $\frac{3}{4}$ -inch for the small), bound with oval strap, and filled with wire lattice of No. 6 wire, with 2-inch mesh. The gates are bolted to posts of $\frac{3}{4}$ -inch extra heavy pipe. On the lower end of the pipe below the step, is fastened a lever arm. The arms of the two gates are connected by a link, and a connecting rod of $\frac{1}{2}$ -inch pipe runs to the front of the car. The arms are so set that when a tension is placed on the connecting rod, the gates close and the lever stands on an angle of 45 degrees to the line of strain. At the front of the car, and in a position to be easily operated by the motorman, is a handle lever on a vertical shaft. At the lower end of the shaft is a third lever, to which the connecting rod is coupled. The locking of the gates is accomplished both in the open and closed positions, by making the relative dimensions of the levers such that the controlling staff lever in its extreme position, travels slightly past its dead center, thus preventing the combination from being opened from the rear end of the car. The 40-foot vestibuled cars on the interurban route, between Minneapolis and St. Paul, have all been equipped, and the plan will be extended to all the cars in both the cities. Accidents caused by boarding and leaving cars in motion, cause the company more annoyance and expense than any others, and it seems as if the system here described would prove an absolute check on them. The only objection to the plan comes from the men who are in the habit of getting on and off cars in the middle of the block. It may mean a slightly slower schedule on the crowded lines, as it necessitates a dead stop for every passenger or group of passengers that get on or off, whereas, it is customary in many cities for passengers to get on and off before the car has stopped, so that it can proceed without coming to a full stop. While this has the advantage of making a faster schedule, it in a measure invites accidents, and it is a question, after all, whether with our present fast moving electric cars, it is not advisable to follow the Minneapolis plan, and absolutely shut off accidents from the source mentioned. Summer cars on this system will be equipped in the same way. Footboards are to be taken off and screens put along the sides, so that the only exit is the rear platform.

LIKES THE NUMBER THIRTEEN.

Evidently the Chicago Metropolitan Elevated Railway people do not entertain any superstitious scruples concerning the much abused No. 13. For instance, the name of the road begins with the thirteenth letter of the alphabet. There are thirteen miles of road constructed. The general superintendent's name, William E. Baker, contains thirteen letters. Also the trainmaster's name, Abraham S. Jones, contains thirteen letters. Singularly enough, Electrical Engineer H. T. Brinkerhoff's name has the same number. The general offices are in the Monadnock block, which commences with the thirteenth letter of the alphabet, the company occupies thirteen rooms on the thirteenth floor, and the entrance is No. 1313. It is said the road will begin operations with thirteen trains.

CIRCUIT OF SUMMER ATTRACTIONS.

Representatives of several of the street railway companies of the large western cities, met in Chicago, February 26, and organized for the purpose of engaging attractions to stimulate summer travel. Those who participated were W. H. Holmes, and B. W. Flowery, Kansas City Railway Company; H. M. Barnett, Twin City Rapid Transit Company, Minneapolis; George B. Hippe, Des Moines City Railway Company, Des Moines, Ia.; J. F. Lardner, Davenport & Rock Island Railway, Davenport, Ia.; G. Stewart Johnson, Consolidated Street Railway Company, Grand Rapids, Mich.; O. F. Miller, Schlitz Park, Milwaukee. W. H. Holmes was chairman and B. W. Flowery, permanent secretary. The meeting was called by H. M. Barnett, who has the privileges of the Twin City Company at Lake Harriet, who also represented the Duluth City Railway, and it was determined to engage high class vaudeville performers for the summer season. Among the attractions secured is a Japanese family now in Europe which has been engaged for eleven weeks and may be kept fifteen weeks. It is also the intention to give Pinafore and other operatic performances at Kansas City and Minneapolis and build a schooner in the lake on which the opera will be given. The season will begin May 1, at Kansas City and a month later at Minneapolis, the other intervening cities taking attractions in their turn.

The REVIEW congratulates these companies on making this arrangement for stimulating summer travel, which is a pet idea of ours, and the REVIEW was the first publication to advocate summer amusements. The big money will be from the fares and the sale of privileges. Heretofore it has been impossible to secure the best attractions for the reason that they could not afford to play a week and then quit except for such a large sum that no street railway could make anything out of it. By the present plan the attractions can be assured of a long season, which will enable the street railways in the circuit to obtain the best in the market. The plan provides for the payment of the railroad fare for each attraction to Chicago, which is divided among each road using it, no road being obliged to take anything it does not want. The railway having the attraction first pays the fare from Chicago, but only pays salaries for the time it is actually employed in entertaining. The next company pays fare from the first stopping place to its city, and the last pays fares from the point from which it takes the attraction to Chicago. In this way the expense is about evenly divided.

It is the intention to charge no admission fee. Experience has shown that the opinion of the REVIEW on this point is correct, for ventures where admission is charged usually fail. People will go to a free show, though they would not pay money to see the same thing. The primary object of these summer attractions is to increase traffic, and receipts from passengers, not to make the show pay for itself in admissions and at the same time increase traffic. Here is where too many companies have made mistakes for they have not acted upon their knowledge of human nature. If the show is free the

people will flock to it by thousands, if it is not free they will wander there by tens, while empty cars will be going to and fro, the conductors nodding and heavy with sleep because they have no passengers. The thousands will bring in enough money in fares to more than pay the expense of hiring the attraction, which will be insignificant as compared with the amount of money it induces to come into the treasury.

Another element must not be lost to sight in connection with summer attractions, and that is the sale of privileges, which always pay largely where there are many people gathered with nothing to do but enjoy themselves and spend money. The best way of letting privileges for the railway companies is on the percentage plan, which was the plan adopted by the World's Fair. Some of the concessionaires lost heavily, but the World's Fair made money. There should be no difficulty in getting 35 or 40 per cent of gross receipts, or even more, from pop corn, peanuts, candy, soda water and similar privileges, while restaurants and those where capital is required should not pay as much. The best way to do with privileges is to ask for bids, rejecting the highest if it does not come up to the minimum, and calling for others. The second call will usually bring in a good man. Checks should be required of the privilege holder on this plan for the protection of the company and it would be wise to have a bond or other good security to insure the responsibility of the contracting party.

The venture of these companies will no doubt exceed their fondest hopes. They have secured attractions which have a reputation and draw well in the winter, where the patrons of theaters pay to see them, and if the same performance can be seen for nothing, crowds will go to see it. The companies invite other street railways to co-operate with them in this plan, as the more there are the smaller the expense. The only expense of securing attractions is the proportion of a stenographer's salary and postage. Mr. Flowery receives no salary from the organization. While the list of attractions secured for this season is good, a better list can be obtained for next year, as there will be more time in which to work. The secretary will send to each road in the circuit, the names of the companies booked, from which to choose what they want. They pay nothing on what they do not use. Next fall an attempt will be made to organize a larger circuit on a permanent basis in connection with the American Street Railway Association.

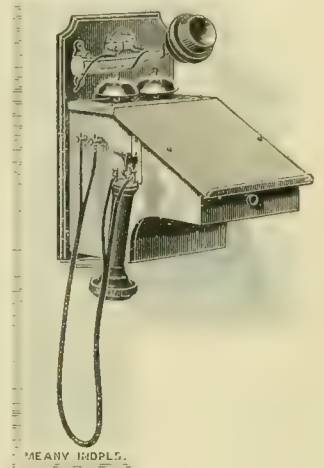
The Cincinnati Street Railway Company will cater to the musical tastes of the community by high class orchestral concerts at Burnet Woods and Eden Park.

The Milwaukee Street Railway has engaged an orchestra for the summer which will play every week day. Concerts will be given alternately in the east and west side parks.

The Stirling Boiler Company, Chicago, has secured a contract for 2,000-horse-power boilers for the Detroit Railway Company.

TELEPHONES FOR STREET RAILWAYS.

It is convenient to have a system of telephones connecting the various divisions, offices and terminals of street railways. When a system is once installed the management will wonder how it got along without it. There are thousands of times when it will pay for its cost, in the saving of time and of money. There is also an opportunity for a company to establish an exchange in places where there are none, or even where the Bell monopoly has its grip upon a community. Rather a neat phone is supplied by the Indianapolis Electric Company, Indianapolis, Ind. It is specially adapted for street railway use and other private lines or a regular exchange system. The manufacturer says the transmitter is absolutely self-adjusting, is more powerful than any granular transmitter made and decidedly more perfect. It can be regulated to any height, and is so arranged that it can be placed in any noisy jarring place, as by placing the hand over the case all external jolting and jarring cease. The instrument is neat and is said to take up less room than any other wall instrument. Those who have used it, say it fulfills all that is promised of it.



SPECIMEN OF STREET RAILWAY ADVERTISING.

It gives one a strong desire these March days to pack his grip and start for Binghampton, N. Y., after examining the handsomely illustrated book sent out by the Binghampton Railroad Company, G. T. Rogers, president; John B. Rogers, treasurer; J. P. E. Clark, general manager. It is filled with summer views of Ross Park, controlled by the company, and other picturesque and interesting spots in the city and its vicinity, all so attractive that one forgets this uncomfortable season, and really thinks until the steam pipes begin to roar, that summer is really here.

Aside from being a good advertisement for the street railway company, the book has the advantage of being a revenue producer, as the business houses have paid for the privileges of placing their cards on its pages. It is not merely local in its effect, but is sent to people and places at a distance in order to secure excursions to the city, which will be another revenue producer, because the cars will be well patronized and new institutions attracted to the city. Other companies will be benefitted by adopting this idea for their own, as it will do for them what it has done for Binghampton.

A METHOD OF PERMANENTLY PROTECTING UNDERGROUND PIPES FROM ELECTROLYTIC CORROSION.

BY HAROLD P. BROWN.

Some electric railway engineers insist that the only thing necessary to protect the pipes is to provide perfect bond wires between the rails, and plenty of feeder wires running from the dynamos to the rails. These are both of vital importance, as at present nearly half the energy generated by the railway dynamos at full load is wasted in merely overcoming the resistance of the conductors leading to and from the motor cars. This loss will be explained in detail in a later article. But, assuming that the bond wires are perfect and the feeder wires ample, it is, of course, true that the current flowing on the pipes would be reduced, but they would still carry a considerable proportion and still suffer corrosion at the points where the current left them.

Referring to Fig. 1, we will suppose that R represents four continuous rails, each having a cross section of nine square inches, or thirty-six inches total. It will be found in nearly any city which meets modern requirements for gas and water service, that considering the cross section of metal of the pipes P in the network, under and parallel to the rails in the same and the two adjoining streets, it will amount to about thirty square inches. The pipes are surrounded by the same moist earth that touches the rails, and they will, therefore, carry from rr to t forty-five per cent of the current, less the loss caused by the resistance of the earth at rr and t, and by the resistance of the pipe joints. To reduce this percentage one-half would require rail feeder wires of thirty-six square inches cross section, if iron, or four square inches, if copper wires. Even with this enormous expense the

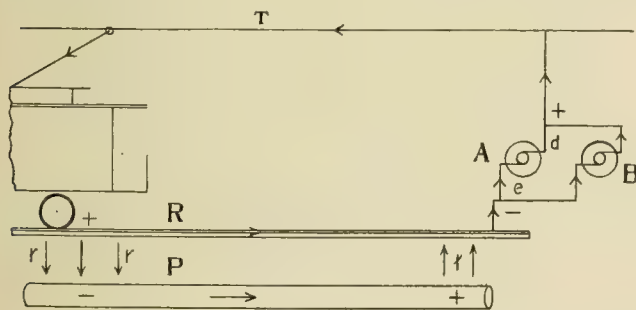


FIGURE 1.

rate of injury to the pipes would be reduced but one half.

THREE-WIRE SYSTEM.

Another method of protecting the pipes which has been tried in a few small cities is an adaptation of Mr. Edison's three-wire system. This system is a great success when used for its intended purpose, the distribution of electrical energy for light and for power from stationary motors. Mr. Edison states that the use of this system for railways with bare overhead trolley wires will not protect the pipes for the reasons given below, and

that it is extremely dangerous. In this system two sets of dynamos are used, as shown in Fig. 2. There are two trolley wires, T and T' over each street. The negative pole e of the dynamo A is connected to T, while its positive pole d is connected to the wire f leading to the rails R, and also to e', the negative pole of dynamo B, whose positive leads to T'. The current is supposed to leave dynamo B at d', and pass through trolley wire T' to one half the number of cars on the road. It divides at r between the rail R and the pipe P; returns to rail at t, passes through the other half of the cars on the road and returns over trolley wire T to dynamo A. If more

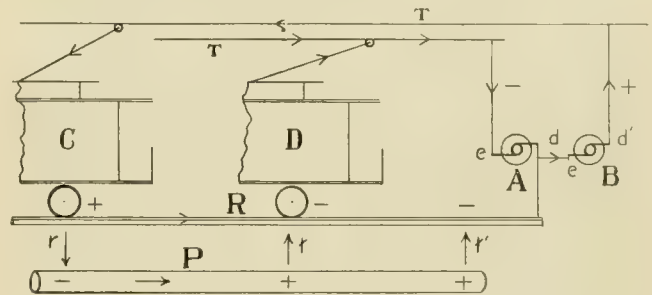


FIGURE 2.

of the cars C are running than cars D, the dynamo B would take the heavier load and the pipes would suffer at t and t'. If dynamo A had the heavier load, the pipes would suffer at t and r. If both loads were balanced the pipes would suffer at t, which would be a constantly shifting point. The result would be that the entire system of pipes would be corroded in the vicinity of any line of rails; that the total amount of corrosion would be somewhat reduced, but that it would be impossible to tell from electrical measurements on the surface of the street the condition of the pipes. The advocates of this system claim that when the number of cars is perfectly balanced between trolley wires T and T' the pipes will not be damaged. This is not true, even though such balancing were possible, which it is not. Experience proves that even in an electric lighting station, it is extremely difficult to perfectly balance the lamps between the two dynamos. With trolley wire T over the up track and T' over the down track, T' would be overloaded when the heavy travel was down town in the morning, and vice versa. It is, therefore, suggested that the two wires be divided between the two tracks, but there are serious practical difficulties in the way of this. The only advantage of this system would be the saving of copper wire to the railroad company. Its most serious disadvantage is the greatly increased fire risk, owing to the presence over each street of two bare trolley wires with 1,100 volts pressure between them. The ordinary trolley system is bad enough and difficult enough to maintain mechanically in position with 550 volts pressure between it and the ground; the double trolley system is far worse in both respects, as it has two trolley wires which are supported by insulated hangers from the same set of span wires, and which have 550 volts between them. But the three wire system, with its 1,100 volts between the two wires,

is so much more dangerous and difficult to maintain, that the fire risk and serious inconvenience to firemen, will cause city authorities and insurance boards to oppose it as soon as its character is understood. Its proper field may perhaps be on suburban roads, and even there the trolley wires, which are alongside of each other, should be of the same potential, the wires being joined to T in one section and to T' in the next section. The Brooklyn strike was an object lesson of the difficulty in maintaining even a single trolley wire against line cutters. But with this system, a striker, unseen on a house top, could easily throw a weighted wire across both trolley wires, melting them instantly and dropping their ends in the street.

INSULATED RAIL FEEDER WIRES.

Some few engineers have insisted that running insulated feeder wires to the rails would protect the pipes. This, for the reasons given in the first paragraph, could not be of any help unless the rails also were insulated from the earth.

PIPE FEEDER WIRES.

Another scheme of pipe protection frequently advocated in the past year, has two points in its favor, one of which, however, if true, is a serious reflection upon the condition of the road, using it, and a rather grim joke upon the engineer advising it. It consists in connecting the negative terminal of the dynamos with a feed wire leading to the points upon the pipes which are positive to the rails. The theory advanced is that this connection will "make the pipes more negative than the rails." This ideal result is utterly impossible unless when broken or rusted bond wires are present in all four rails not far from the station. Referring again to Fig. 1, it is proposed to run a pipe feeder wire from the negative pole *e* of the dynamos to the pipes at *t* where they are positive to the rails. This wire is supposed to "pump the current out of the pipes" and make them negative to the rail! Assuming, as before, that there are four continuous rails, or their copper equivalent, leading from *t* to the power house, and that, as is generally the case, one-third of the current is returning on the pipes from *r r* to *t*, a pipe feeder wire from the latter point to the station would require a cross section of eighteen square inches if iron, or two square inches, if copper to make the pipes at *t* of the same potential as the rails at that point. But to make the pipes sufficiently negative to the rails, to be safe, this cross section would need to be at least doubled. If as was reported from one city whose pipes were "protected" in this way, the pipes were really negative to the rails when a connection of this kind was made with a wire of practical size, it is evident that the rail returns from that point were in so bad a condition that nearly twenty per cent of the total energy was lost in going 1,500 feet from the power house. Protecting the pipes at such a tremendous cost might be worth while if it really did protect them, but it cannot do so, for any definite period. The rail bonds are sure to be patched when they get very bad, and within a very short time the con-

tact at *t* between the pipes and their feeder wire will become so poor that the old condition will re-appear. Few electricians appreciate the difficulty of making and maintaining a good electrical contact between two different metals even in a dry room. And still fewer have any idea of the tremendous difficulty in maintaining such a contact underground. For the past four years experiments have been under way at the Edison Laboratory to obtain between underground steel conductors a perfect electrical contact that would not be injured by water, acid, alkali or mechanical movement. Every practical combination of metals, every method of joining, of excluding moisture, of providing for expansion and contraction, has been tested with heavy currents and then buried for the test of time. The conductors have been machined and scraped to an exact fit; bolted together under heavy pressure; plated with copper, tin or zinc; provided with sheet lead, tin foil or other soft metal, or various non-oxidizable alloys placed under compression between the surfaces; covered heavily with paint or other water repelling insulation; or a combination of several of these. But time and heavy currents have caused the failure of every device with but a single exception, of which more later. When two different metals are joined in an electric circuit there are three sources of loss that must be encountered; first, the resistance of the metal itself; second, the contact or surface resistance which can be somewhat reduced by increasing the pressure; and third, the thermo-electric loss. Electricians always calculate upon the first; sometimes give scant attention the second, but entirely ignore the third. Yet with heavy currents the total loss is often three times the amount due to the first alone. The causes and cure of these latter losses are outside the scope of this paper; but the maintenance of an underground contact between a copper wire and a steel rail, or an iron or a lead pipe is a problem that requires notice here. However ample the area of the contact between such surfaces; however great the pressure holding them together and however careful the methods of excluding moisture, there are several agents of destruction constantly at work that are bound to succeed. Even when two iron plates are joined together in the best mechanical way and placed underground, their surfaces are sure to rust; oil or grease of course cannot be used between them. Even a thin film of iron oxide, on either surface, is of high electrical resistance, injures the conductivity of the joint and permits the entrance of more and more moisture, thus causing further damage. But when a plate of iron and a plate of copper are bolted together and buried, the difficulties of maintaining an electrical contact are greatly increased. The two metals in contact with the moisture of the earth form a galvanic couple whose action corrodes the iron. The different ratios of expansion due to increase of temperature from weather or current flow, breaks down both the contact and the protecting paint or other covering, letting in water. And the different rate of molecular vibration of the two metals due to the transmission of current has a similar action. Therefore, any ordinary

mechanical connection between an iron pipe and a copper wire is doomed to early destruction. In one city a pipe clamp is used in which lead is placed between the pipe and the clamp, and the whole insulated with cotton tape and black paint. It requires slight engineering skill to predict the life of painted cotton as a means of excluding water. And as for the lead, which is evidently used to secure a compression contact and save careful fitting of surfaces of pipe and clamp, it invites a still earlier destruction, since lead suffers more severely from electrolytic decomposition than iron or copper. And to further increase the resistance of the joint, the clamp is of iron and is welded to the copper wire. Thus a pipe, which is already positive to the rails and suffering corrosion, is to be relieved by an insufficient feeder wire and the current is invited to pass from iron to lead, from lead to iron, and from iron to copper, suffering a heavy loss at every contact and making three joints where one is too many. With a copper rod $\frac{5}{8}$ of an inch in diameter, and 30 inches long, having a contact area of ten times its cross section against an iron plate, the surfaces being bright, accurately fitted and held together by very heavy pressure, the electrical loss was $\frac{8}{30}$ of a volt with 1,200 amperes. In other words, with the best made mechanical joint between iron and copper the loss was .426 electrical horse-power. Adding the other joints of equal area, iron to lead, and lead to iron, the loss was increased twenty per cent. It is evident that the engineer suggesting this joint has never tested it in heavy service with the proper instruments.

A SUCCESSFUL METHOD OF PIPE PROTECTION.

There are three problems to solve in protecting pipes from electrolytic corrosion:

First. To keep the pipes at least one volt negative to the rails at all points, and at all times.

Second. To diminish, as much as possible, the flow of current on the pipes.

Third. To secure some permanent, inoxidizable contact of low resistance, between the pipes and the necessary feeder wires.

In Fig. 3, A represents the main battery of dynamos whose positive poles *d* are joined to the trolley wire *T*, and whose negative poles *e*, are connected to the rails *R*,

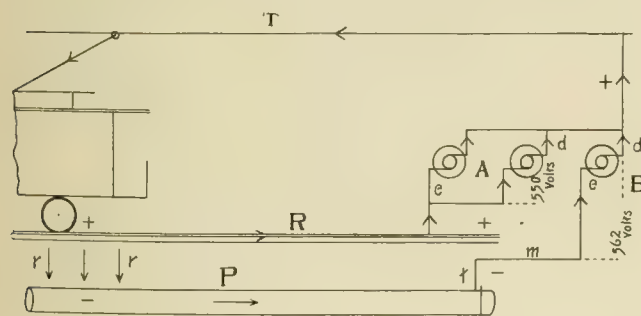


FIGURE 3.

in the ordinary manner. These dynamos are adjusted to maintain the usual 550 volts pressure between *d* and *e*.

The dynamo B, represents at first about one-quarter of the total capacity of the station, but the proportion can be reduced when this plan has been put into service. Its positive pole *d'*, is connected to trolley wire *T*, but its negative pole *e'* is connected by suitable feeder wires *m* to the points *t* on the pipes which were previously positive to the rails. The pressure of dynamo B is then so adjusted that it gives five to twelve volts more than dynamo A; as their positive poles are joined, this difference of pressure asserts itself by maintaining the pipes negative to the rails by twelve volts, less the previous positive charge and the loss incurred in passing the current through the feeder wire *m*. For instance, at Newark, N. J., where I am consulting engineer for the board of works and the gas companies, the gas and water pipes were seven volts positive to the rails at a point about 600 feet from one power house, and the service pipes and lead joints were seriously injured. The average current output of the dynamos was about 1,200 amperes, of which 400 returned by way of the pipes. The dynamos A were run at 550 volts, and by running the dynamos B at 562 volts, the point *t* on the pipes, which had been seven volts positive to the rails, was maintained at 3 volts negative, and all further corrosion checked. The closing of the circuit through *m* and dynamo B, caused a drop averaging 60-horse-power in the station load. This was due to removing the resistance of the earth which was encountered by the current in the pipes *P*, in passing from *t* to the trolley wire *T*.

This method, as thus far described, entirely checks electrolysis of the pipes unless it be around some poor joint on same. Such a joint, however, can be easily detected by a low reading volt-meter on the surface of the street, and this action checked by continuing the wire *m*, diminished in size, to a point beyond the poor joint. It is true that as far as described, the tendency of this method is to slightly increase the current flow on the pipes, but this is only the first step in the method. The current reaches the pipes at *r r* near the ends of the railway lines, and here electrical measurements have shown in some cases at Newark that the rails were 15 volts positive to the pipes. This difference, of course, causes a large flow to the pipes, and is produced by poor bonds between the rails and insufficient rail feeders, or by the fact that the network of pipes may lead directly to the power house, while the lines of rails may take a round-about course. But with proper bonding, the difference of pressure between the pipes and rails at *r r* may be brought down from 15 volts to one volt, by carrying out from the higher pressure dynamo B, a continuation of the wire *m* to the rails at *r r*. By this means, and by the proper feeder regulators in the wires *m*, the rails at *r r*, and the pipes at *t*, whose previous positive potential caused the current flow through the earth, can be made negative and the current flow on the pipes cut down to a minimum. It was feared by some electricians that in order to keep dynamo B at a definite increase of pressure over the dynamos A, constant shifting of its rheostat

would be necessary as the station load varied; or, that the dynamos would not regulate properly. No trouble has been encountered from either source with dynamos of two of the leading manufacturers.

This brings us to the third problem; a permanent, inoxidizable, elastic contact of low resistance between iron pipes and the feeder wires *m*, or between the meeting ends of steel rails, which contact shall possess an affinity for each metal. Here the writer has been permitted to share in, and to benefit from, the experiments leading in this direction, suggested by Mr. Edison, and carried on for the past four years. A few square inches on the top of the pipe is filed clean of paint or scale, and rubbed with a silvery metal compound which at once turns any iron rust into pure metallic iron and amalgamates the surface. Metallurgists have long considered impossible a stable iron amalgam, but it nevertheless exists, and is so permanent that neither water nor any acid or alkali which it will encounter under the streets can decompose it or rust the iron surface beneath it. A U-shaped bolt is then slipped under the pipe and a cast iron yoke placed over it. The end of feeder wire *m*, has been brazed to a copper saddle, $\frac{1}{8}$ of an inch thick, fitted between top of pipe and bottom of yoke. The center of the saddle on each side of the wire is cut away to form a receptacle into which, after the copper has been amalgamated, is placed a plastic alloy of electrical origin. The nuts are then tightened up and locked. This alloy gradually hardens and expands, placing the joint under a tremendous pressure, and forming a perfect electrical contact of extremely low resistance, which will not corrode. Moreover, when a joint between iron and copper is thus prepared, all of the contact resistance disappears, and the thermo-electric loss is much reduced. But when this alloy is used between iron or steel surfaces, both contact resistance and thermo-electric loss are eliminated. It will give a comparative idea of the efficiency of these contacts to state that, with a copper rod $\frac{5}{8}$ of an inch in diameter, and 30 inches long, having an area of ten times its cross section, in contact with a steel plate, with surfaces accurately fitted together, and joined with great pressure, the loss in transmitting 1,000 amperes was $\frac{2.4}{120}$ volts. The same with amalgamated surfaces, and with the plastic alloy between steel and copper was $\frac{1.3}{120}$ volts. With the plastic alloy between amalgamated surfaces of steel and steel it was but $\frac{4}{120}$ volts. Galvanometer tests of joints for heavy currents are, of course, worthless, as they do not show working conditions.

A large number of these joints were put underground about four years ago, in order to make a thorough test. Measurements recently made with heavy currents, show absolutely no deterioration. Many of them have been taken up and no trace of oxidation was found, the surfaces being perfectly bright. Thus has the third problem in the way of permanent pipe protection been solved, and its prompt application will save money to water, gas, and subway companies, and to the electric railways.

CONCERNING GRADE CROSSINGS.

Grade crossings of street and steam railways are always dangerous, and no matter what devices may be used to reduce danger to a minimum, it will always be necessary to be extremely careful, in order to prevent accidents. The Philadelphia Bulletin, commenting on a recent accident, says:

Here is a trolley accident which needs more than ordinary consideration. It occurred in the suburbs of Pittsburg; but, as it was indirectly the result of an ordinance similar to one which is in force in Philadelphia, it behooves this city to take notice of it. A trolley car was about to cross a railroad track, and the conductor, in obedience to the law in force in Pittsburg and Philadelphia, ran ahead to see that the track was clear. He found that it was, and signalled the motor-man to come ahead. The latter did so, but just as the car reached the railroad tracks the trolley slipped off the wire, as trolleys have a habit of doing, and as the conductor was not on the back platform to replace it, a slight delay occurred. Meanwhile an express train, running very fast, came along, and before the trolley car could be started up again, dashed into it, killing one passenger and injuring a number of others. The occurrence emphasizes what thousands of street car passengers have noticed in crossing railroad tracks at grade, that it is a waste of time and more dangerous than useful for conductors to leave their cars and run ahead of them at the crossings. In most cases the man on the front platform can see just as well as the man ten feet ahead of him, whether or not the track is clear, and this is especially the case where there are gates and a watchman. What is needed more than any of these precautions, however—or, perhaps, in addition to them—is a bell to ring at the crossing when the train is within a certain safe distance. With this to warn the motor-man, the conductor need not leave his car, time can be saved and there will be somebody at hand to adjust the trolley if it happens to “balk” at a critical moment.

It will not do to abandon the practice of sending the conductor to the front at grade crossings. Accidents never happen, except when everyone is confident that nothing can happen, and is secure in his carelessness. Electric alarm bells are well enough in their way to supplement the efforts of conductors or flagmen, but they are likely to fail when most needed, and as they are supposed to ring continuously from the time the connection is made until the train has passed the crossing, it is impossible to tell where the train is without looking. Some appliance for keeping the trolley on the wire will diminish the danger, but it cannot communicate an alarm when a train is approaching. This can best be done by a conductor or some authorized person who stands where he has a view of the track free from all obstructions.

Granville S. A. Gardiner, vice-president of the Graham Equipment Company, Boston, has retired entirely from his ticket business in Providence and will devote his attention to the sale of the Graham truck. When not on the road, he will be at the New York or Boston office. The increasing business of the company has made it desirable for the company to secure Mr. Gardiner's exclusive services.

PHYSICAL EXAMINATION OF MOTORMEN.

BY H. S. COOPER.

The writer is in receipt of a circular from an accident indemnity company, stating its intention to adopt a system of physical examination of the motormen of the electric roads insured by it. This is a measure that should not only have the full co-operation of the insured, but it is one that should be adopted by every street railway for its own sake, whether insured or not. It is only lately coming to be fully understood and appreciated that, among all the employes of all kinds of traffic companies, no one class holds the lives of so many people, and the profits of so many corporations, in their hands, as do the gripmen of cable and the motormen of electric cars. This may seem an unwarranted statement at first sight, but if due consideration is given to the fact of the enormous number of people who are carried on the cable and electric cars, and also the enormous number among which this traffic is carried on, the statement will not seem so overdrawn. The swift moving car carries as much danger to those outside of it as to those inside. The loss and damage account is equally as great for those who are not passengers as for those who are, and it is this element that adds so greatly to the responsibility of the men who "run" the car.

While there are many duties and responsibilities which the two members of this class have in common, there are also a great many which are peculiar to the electric service, and which require qualities in the motorman that are not absolutely essential in the gripman. This difference is due to the generally greater speed, and its variability, in the electrically driven car, to its complication of delicate and intricate machinery and fittings, to its capability of reversal of direction at will, and to its being a self contained propelling unit. These points are all lacking in cable traction, and they call for additional qualifications in the man controlling them. He must not only know the rules of the road and of the town, his route and his schedule, but he must also know the capabilities of his car, its machinery, and the system under which it is run, and he must be prepared and able, mentally and physically, to instantly and intelligently use those capabilities to their very best advantage in order to save life, limb or property, or to maintain or correct a schedule. To do this he must have "mens sana in corpore sano," and this cannot be where any of the senses, organs or limbs are defective. The senses must be clear and perfect to transmit correctly and instantly the impressions made on them, the nerves must be steady and ready to carry their message promptly to the muscles, and they must respond at once and accurately to the call. A second is a very small space of time, but it is sometimes the size of the unknown quantity of the "personal equation," and like the boy's pin, has been known to save many lives.

The writer has been very fortunate in the fact of having had immunity from accidents on all the roads which have been under his management, and he believes that

one of the leading causes of this immunity has been that he has always carefully selected and graded his men with special reference to both their mental and physical capabilities for this position, and has weeded out those who showed dangerous imperfections of either. He believes from this experience, and from his observations of the contrary course on other roads, that this point is a vital one in the elimination of that haunting unknown quantity, accident loss, from the expense side of the ledger.

Given good, succinct and comprehensive safety and emergency rules, carefully explained and intelligently enforced; given all the safety apparatus of the present day; given intelligent and willing men, and the results may even then be disastrous, if, on account of some physical disability or inability, the premises are wrong, or the ability for prompt, nay, instantaneous, action be lacking. Therefore the proposition of the indemnity company, as stated, should be met with cordial co-operation by its clients, and the lesson of it be taken to heart by those who cannot, will not, or do not insure.

STIMULATES TICKET PURCHASES.

Far away Bombay has a plan for stimulating the purchase of tickets, which is in force by the Bombay Tramway Company Limited. The circular here reproduced

Bombay Tramway Company, Limited.

NOTICE TO PASSENGERS.

INCREASE OF PRIZES.

The Company has decided from the 1st November next to increase the number of its free monthly prizes. Instead of the 17 prizes heretofore drawn for of the aggregate value of Rs. 350, the following 78 prizes of the aggregate value of Rs. 350 will be drawn for next month and every succeeding month, until further notice:—

Eight Prizes of **Rs. 25 each.**

Twenty do. **Rs. 10 each.**

Fifty do. **Rs. 3 each.**

Every passenger by the tramway who **keeps his tickets** will have a chance of winning one or more of these prizes. The draw will take place at 3 P. M. on the 9th of each month (except when that date falls on a Sunday when it will be drawn the next day) at the Company's offices, Colaba Causeway, and any passenger may attend. The names of the tickets winning the prizes will be made known by handbills circulated in the cars, and obtainable at the Company's offices.

Keep your tickets and do not lose your chance of winning a prize.

By order,

E. T. ANSELL,

Traffic Superintendent.

12th October 1894

advertises the plan. Public lotteries of any kind being contrary to the laws of the country, the special sanction of the government had to be obtained for the donation of

the prizes. Their object is by attaching a contingent value to the tickets to encourage the company's passengers to make a point of obtaining tickets from the conductors, and to preserve their tickets, thus lessening the risk of the conductors reobtaining and reissuing them. The prize system also serves to attract passengers and to popularize the tram cars as a means of conveyance.

Duplicates of all tickets issued by the company are retained for verification in the ticket boxes. At the end of a month they are made into a heap and a deputation of passengers draws from them seventy-eight duplicates, the corresponding tickets being the prize winners. The company issues on an average 1,500,000 tickets each month. There are eight prizes of about \$10 each, twenty of about \$4 and ten of about \$1.25 each. The increase in the number of prizes offered each month would seem to indicate that the plan is successful.

THE GLASGOW UNDERGROUND CABLE ROAD.

The first underground passenger railway to employ the cable as a motive power is now under construction in Glasgow. It is officially known as the Glasgow District Subway and is an underground belt railway making a circle $6\frac{1}{2}$ miles in circumference. The railway will be carried in double tunnels, similar to those used by the City and South London Electric Railway. Each tube is

11 feet inside diameter. Figures 1, 2, 3 and 4 show the plan of construction. The shifting sand and mud encountered has been the cause of much difficulty, as the road passes twice under the river Clyde.

As said before this will be the first underground passenger cable road in the world. The cable was chosen because the conditions on this road as to frequency of service approximate those on our most successful dividend paying American cable roads. The road being a double track and circular, one cable will make the complete circle of one track and the other the complete circle of the other track. There will thus be practically a duplicate service and in case of a breakdown on one track the other track can carry the traffic. The service on the two tracks will be in opposite directions. The cable and carrying pulleys will of course be above the track level. The power house engines and cable driving machinery will follow American practice. There are to be two 1,500-horse-power simple non-condensing Corliss engines. They transmit their power to the cable machinery by means of Lambeth cotton ropes. Walker's differential drums are to be used. This will be the first passenger cable road in England to use the American method of driving. It is the universal custom in England to use idler drums to hold the rope to the driving drum while the American method is to pass the rope back and forth between two driving drums.

The gage is 3 feet 9 inches, the narrowness being

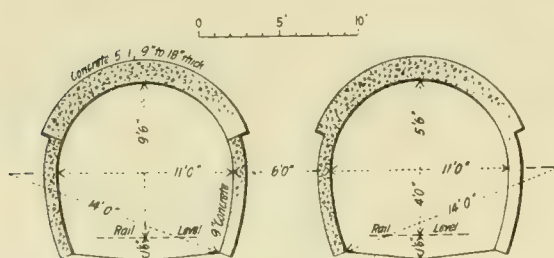


Fig. 1.—Rock Section.

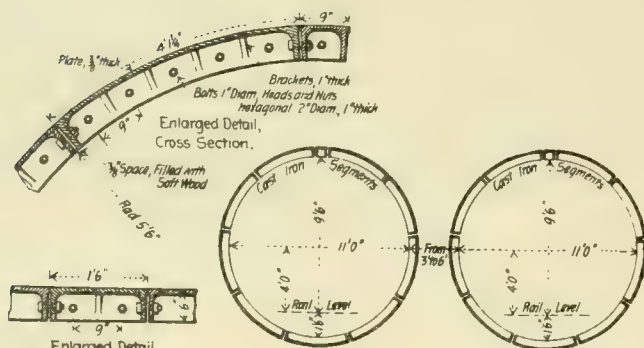


Fig. 3.—Tunnels in Soft Grounds.

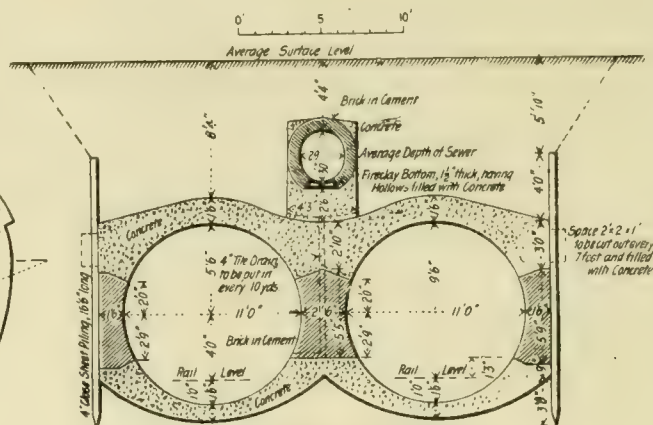


Fig. 4.—Cut and Cover Work.

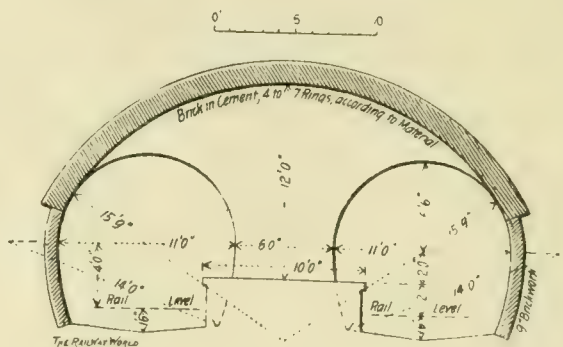
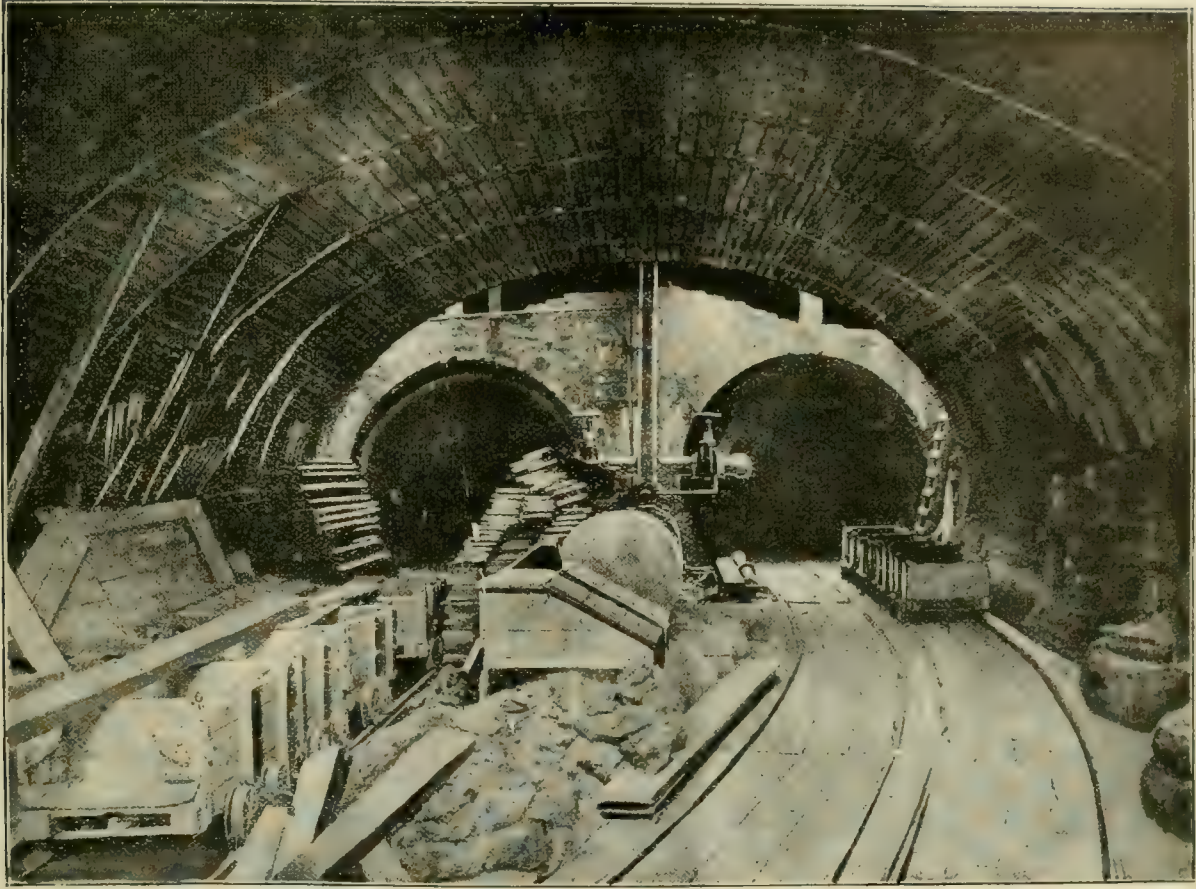


Fig. 2.—Rock Section at Island Stations.



INTERIOR OF TUNNEL.—GLASGOW.

thought best on account of the shape of the tunnel, which allowed of a better permanent way with the narrow gage. The curves are all very light although the road takes a general circular course. The cable speed is to be 15 miles an hour which will probably be increased. The profile of the road provides for a slight grade leading up to each station to aid in stopping and starting. Long double truck cars are to be used, 41 feet over all and with 32 foot bodies. The plan is to run two cars in a train. The illustrations are reproduced from the Railway World of London. D. H. Morton, of 95 Bath street, Glasgow, is engineer of the work.

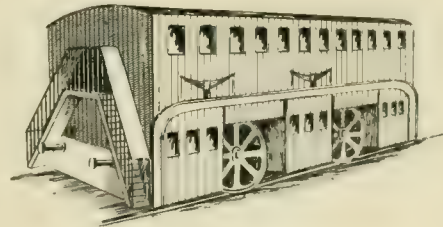
SNOWED IN FOR TWO DAYS.

February was a hard month for most of the street railway companies, on account of the unusual amount of snow which fell. In some places lines were temporarily abandoned, but in others they were kept open, though only by extraordinary efforts. The worst case of blizzard that has come to the REVIEW was near Chester, Pa., where two trolley cars, with several passengers, were snowed in from Thursday afternoon at 5 o'clock until 7:50 the following Sunday evening. Drifts were nine and ten feet deep, and the cars could neither advance nor return. Six passengers were on one of the cars, and on the other, which was stranded on another portion of the

line, there were only the crew. Fortunately for both parties, there were houses in the neighborhood, where the prisoners were accommodated with food and a place to sleep. The cars were released by a gang of shovelers, who had been working for two days clearing the line.

DOUBLE DECKED CARS.

Double decked passenger cars are coupled to every freight train in Germany to accommodate inter-urban traffic. A new style of car for this purpose has been brought out by the Hessian railway. In the first or



lower story are first, second and third class compartments, and the baggage master's and conductor's room. The upper story is entirely given over to third class passengers, who are the most numerous. Wheels eight feet in diameter support the structure.

NELSON INSULATED TROLLEY CROSSINGS.

The importance of sectioning trolley lines is being recognized more every day, not only because an accident on one section does not interfere with the others, but because of the mechanical and electrical strain on the occurrence of short circuits, when the line is not sectioned. In a large system where the several lines cross and recross each other, the insulated trolley crossings are of much value in order to carry out the general plan of sec-

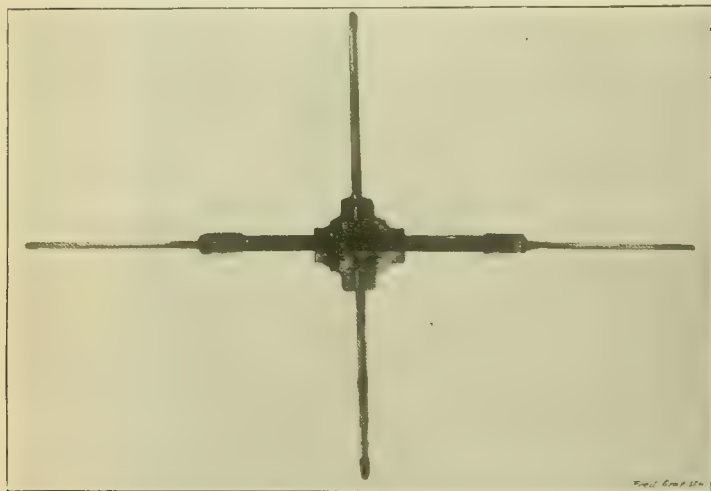


FIGURE 1.

tioning lines; but in cities where there are two or more electric railways, each operating separately and distinctly its own lines, the question of insulated trolley crossings is one of great importance to the minds of the general managers. The Nelson insulated trolley crossings have been in use in St. Louis and other large cities for the last three years. They are made of the best grade of hard fibre and bronze metal of suitable mixture, being put together in first-class, workmanlike manner.

Fig. 1 shows a top view of the right angle crossing.

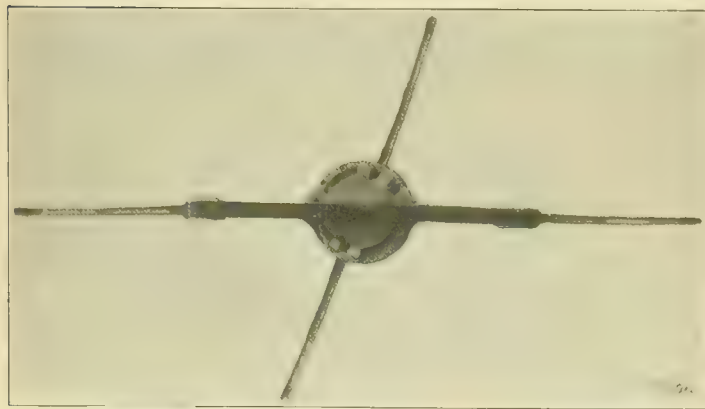


FIGURE 2.

The runners are tapered and trimmed to the edges, so as to prevent the trolley pole from flying off in passing over the crossing.

Figure 2 illustrates a top view of the adjustable crossing, which is made so that one of the lines can cross the other at any angle.

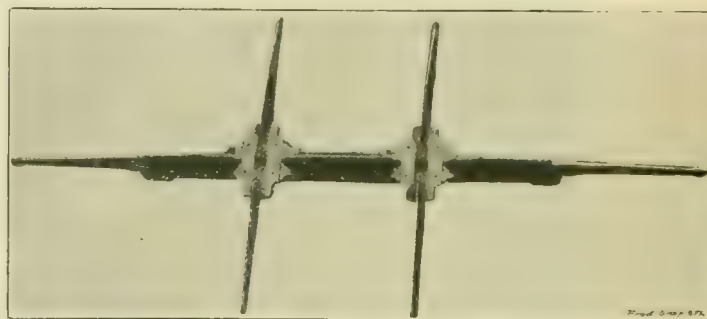


FIGURE 3.

Figure 3 is the double right angle crossing, to be used where two lines cross a single line at right angles.

Figure 4 shows the double adjustable crossing, which is so constructed as to allow two lines to cross one straight line at different angles.

In addition to the styles shown above, the Nelson insulated crossings are made in various other styles, in fact

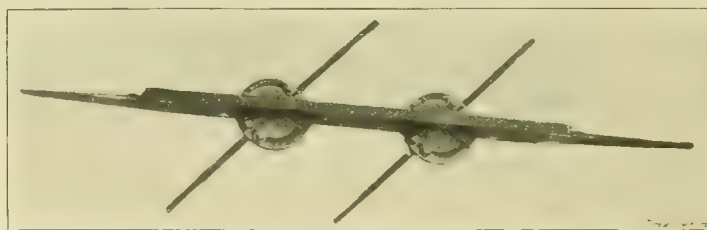


FIGURE 4.

the manufacturers have patterns to answer every purpose in overhead construction. These crossings have been adopted by the large electric railway systems in Philadelphia, Brooklyn, St. Louis and many other places, there being upward of 1,000 of these Nelson insulated trolley crossings now in use. Arthur S. Partridge, Bank of Commerce building, St. Louis, is the selling agent for these crossings, with Charles J. Mayer, Betz building, Philadelphia, in full charge of the eastern territory.

CABLE ROADS IN EDINBURGH.

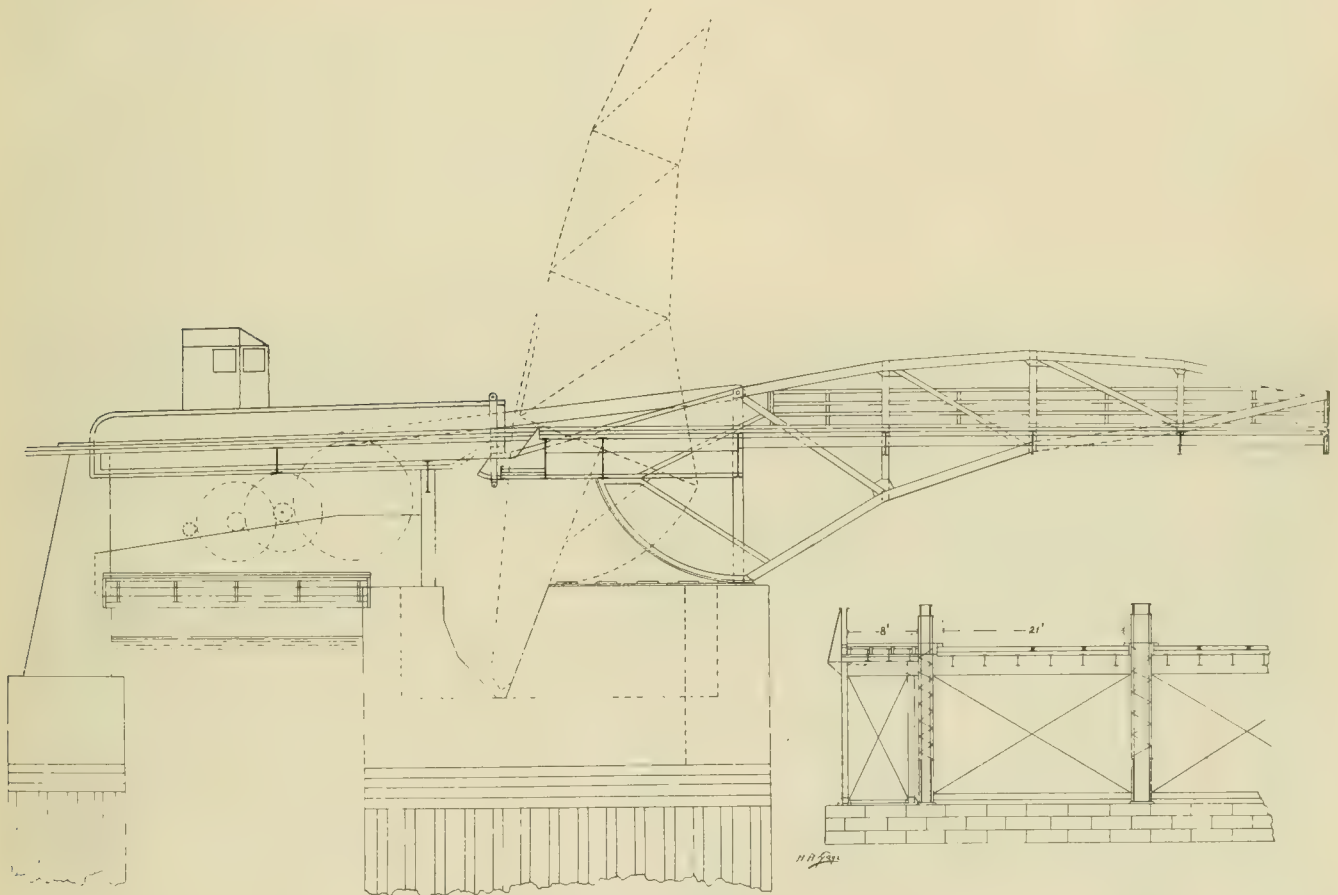
All the principal tramway lines of Edinburgh and Leith, about fourteen miles, now operated by horses, will be converted into cable lines upon plans prepared by the city engineer. Two power houses will be built. One of the lines has so many curves that it will be necessary to adopt another route. Several new cross town lines are proposed, but will not be decided upon until the greater work is completed. The entire cost is estimated to be about \$940,000.

The White-Crosby Company, Baltimore, has secured the contract for building the Buffalo & Niagara Falls Electric Railway.

VAN BUREN STREET ROLLING LIFT BRIDGE, CHICAGO.

Recently the city of Chicago opened for traffic the Van Buren street bridge, a new type, which is known as a rolling lift bridge on account of each half of the bridge rolling backward and upward upon a segmental girder at its base. This type of bridge was adopted because a swing bridge would divide the river into two narrow channels, neither of which would be in line with the channel above and below it. Another objection was the desire of the Metropolitan West Side Elevated Railway

and pier on the west being separated by forty feet. This space is bridged with plate girders, forming a room for the machinery. On the east side the approach and pier are combined in one piece of masonry, a room having been built in the abutment for the machinery. In each room are placed the motors, air pumps, air reservoirs and other machinery necessary to operate one-half of the bridge, for each half is operated independently of the other. The moveable portion is 154 feet long, divided into two equal parts. The bridge is fifty-nine feet wide over all with two twenty-one feet roadways with car tracks, and two foot ways each eight feet wide.



DOTTED LINES SHOW POSITION OF BRIDGE WHEN OPEN.

to cross the river at a point near by. A swing bridge with longer spans than the one replaced by the new bridge would not improve the channels, but it would interfere with the proposed bridge of the elevated road. The new type of bridge, having no center pier, permits a straight channel, and does not interfere with the elevated company.

Warren R. Roberts, city bridge engineer of Chicago, who had direct charge of the work, kindly furnished us a description of the bridge which is used by the West Chicago Street Railroad Company, as well as by the city. Fig. 1 gives a side elevation of the east half of the bridge. The bridge is shown closed, the dotted lines indicating the position of the bridge when fully opened. The west approach is longer than the east approach; the abutment

Piles fifty feet long driven about three feet centers and nearly to the water, sawed off seventeen feet below the water line, formed the foundations. Open caissons were used for building the masonry for the west abutment, west pier and the pier portion of the east abutment. The bottoms of the caissons consisted of four courses of pine 12 by 12 inches, and the side walls of a single course of timber of the same dimensions. Each caisson was built at the dock, filled with concrete, until it sunk almost to the level of the piling, floated into position, and the concrete continued up to within two feet of the water line. The pier was then faced up with Bedford masonry to the coping. In each pier were formed three pockets, each to receive one of the tail girders of the moveable portion of the bridge when revolved into the vertical

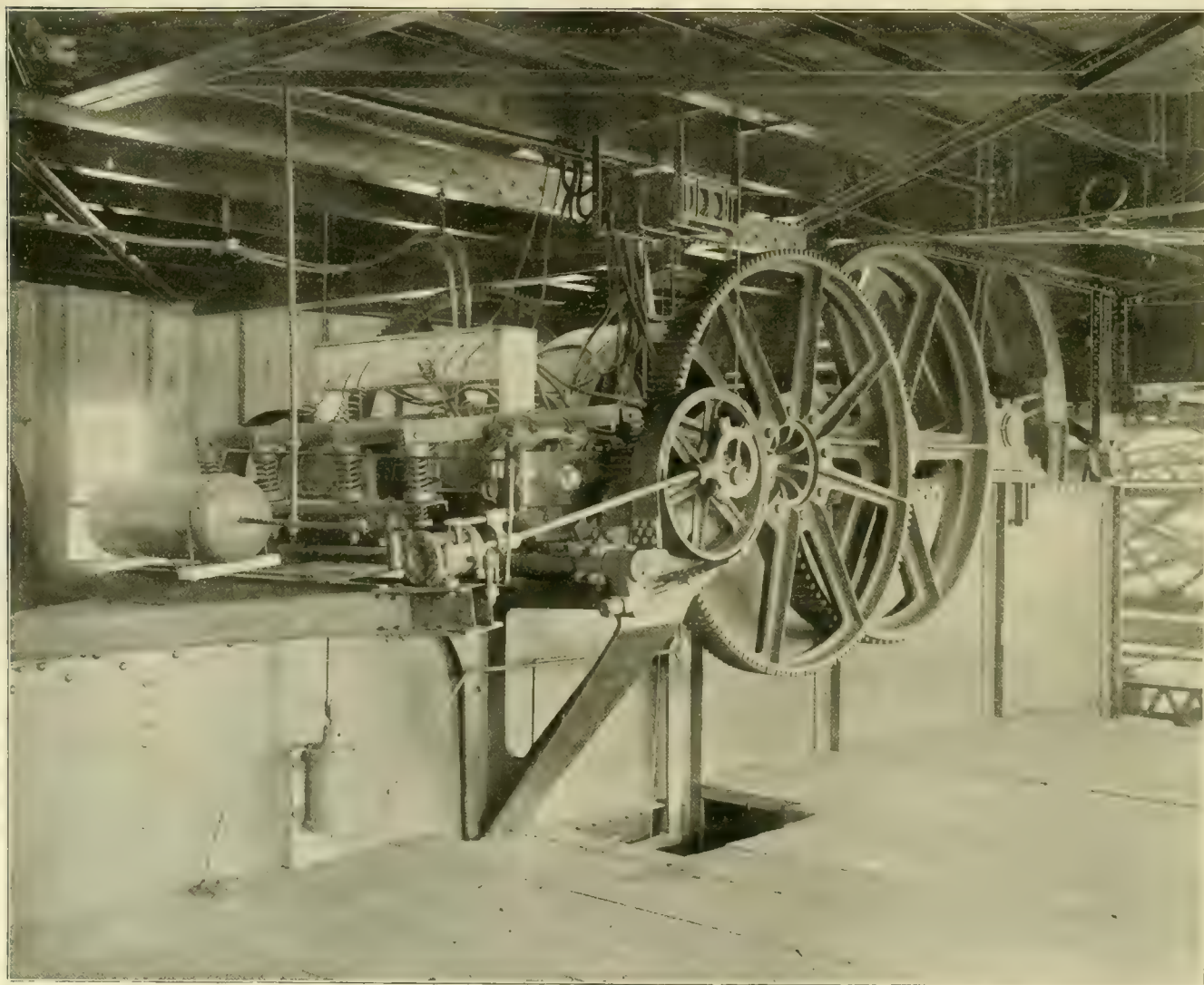
position. Directly upon the masonry of each pier were placed three very heavy castings, each of which forms the bearing for one segmental girder.

The sidewalks and roadways on the approach join those of the moveable portion of the bridge. When the bridge is raised the floor of the moveable part of the roadways passes back and beneath that on the approach, making it necessary to bring the latter to a very thin edge to form a connection when the bridge is closed. The movement of the sidewalks is the reverse of the roadways, the moving sidewalk passing above the fixed part as the bridge is raised.

An operating strut running from the machinery is joined to the center truss by a pin connection, and within the strut is a rack which engages with the rack wheel. The first movement of the strut backward is to revolve the cam crank which operates on a section of levers withdrawing the pin latches. At the same time a small wheel strikes the cam of the rack wheel, and its first movement is to withdraw the latch from the tail girders,

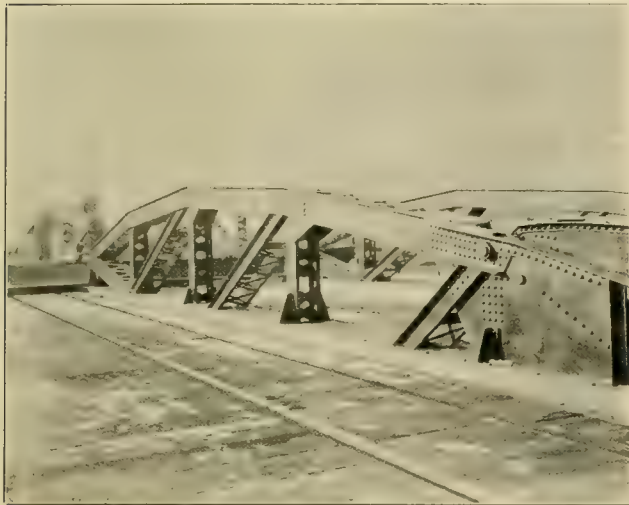
leaving the bridge free to move, which is accomplished by the succeeding motion of the operating strut. In closing, these movements are reversed. There is only one set of machinery and one operating strut. The arm to the center acts as a cantilever, and the tail girder, being the anchor, is held down by heavy anchor rods reaching to the bottom of the masonry. In raising the bridge, the power from the operating strut is carried from the center truss to the two outside trusses by heavy vertical bracing posts.

Within the tail girders and between them, beneath the roadway floor, are placed the weights for counter balancing the bridge. These weights are sufficient to prevent the bridge from coming to a horizontal position when freely lowered by the brakes. The bridge when so lowered comes to rest a little above the horizontal, the current is then applied, and the motors force the bridge down to a level. The machinery consists of two 50-horse-power motors on each side of the river, hung on the same shaft and wired to operate separately or in unison. On each



MACHINERY FOR OPERATING ONE-HALF THE BRIDGE.

end of the motor shaft is an automatic brake wheel, the brakes being operated by compressed air. The compressors are operated by an eccentric on the end of the motor shaft. If at any time during the motion of the bridge the current is cut off, these brakes are automatically applied. There is also an emergency brake, for use in case of accident on the center of the first shaft back of the motor shaft, that can be applied by opening an air valve. The bridge gates on the right hand roadway at each end of the bridge and the signals at the center of the span are also operated by compressed air, which is



ONE-HALF THE BRIDGE.

generated on the west side of the river and conducted to the east side through an iron pipe beneath the river and stored in a reservoir.

The gear wheels shown in the illustration are all of cast steel, except the spokes and hub of the rack wheel, which, with the journal boxes, are of cast iron. On the center girder of each approach is an operator's house, to which runs all electric cables and air pipes for completely controlling one-half of the bridge. The bridge, which was started early in 1894 and opened for traffic January 31, under the supervision of Samuel G. Artingstall, city engineer, was designed and patented by William Scherzer, who died before the drawings were completed. The cost, including the approaches, electrical equipment and cables to the power house, was \$169,700. One illustration shows a sketch of the bridge with one span lowered, the broken line illustrating the position when opened. There is also a view of one side of the bridge showing the other partially raised, and the car tracks, with the Metropolitan Elevated structure to the north. Another view is the machinery that lifts one side of the bridge. The contractors were: substructure, Fitz Simons & Connell Company, Chicago; superstructure, Charles L. Strobel, Chicago; Elmira Bridge Company, Elmira, N. Y.; machinery, Scaife Foundry & Machine Company, Pittsburg; electrical equipment, brakes, air compressors, signals, etc., G. P. Nichols & Bro., Chicago.

AS SEEN FROM OVER THE SEA.

A well known English paper, "Today," published in London, comments as follows on Judge Gaynor's recent temporary ruling. The deduction as to the dangerous possibilities of municipal ownership are identically along the line already remarked by this magazine.

The action of Judge Gaynor, of Brooklyn, is an admirable object-lesson of what might happen over here, did the progressive party obtain their desires and become the purchasers of the voting power for the county council. Judge Gaynor, I take it, is one of the numerous New York officials dependent for their livelihood upon the bounty of "Tammany Hall." We have heard how judges and magistrates are kept in the pay of this precious gang, and made to do their bidding, and manipulate law and order to their necessities. The tram workers of Brooklyn have struck for higher wages. They may be justified in doing so, or they may not; that is beside the present question. Judge Gaynor issued a writ of mandamus requiring the tramway companies to resume work instantly, under penalty of forfeiting their charter. If the company cannot obtain men to run the cars at a reasonable rate of wages, says Judge Gaynor, they must pay unreasonable rates. Why does Judge Gaynor, holding a high official position, outrage justice and common sense by such a monstrous order? The answer is simple; if he did not do so the tramway workers would at the next election see that he was ousted from his living. It is a shameful and discreditable bargain between the two. Judge Gaynor has to disgrace his profession in order to secure his income, which can be given or taken away from him by one of the parties to the dispute.

"Were the London County Council to obtain that power they desire to obtain, the same thing would be happening over here. Supposing that they had the control of the police, and a dispute arose between a tramway company and its workers, the men might strike for higher wages, and refuse to allow the cars to be run, or any new men to be employed by the tramway company, and threaten violence if their orders were disobeyed. Would the members of the county council, elected by the votes of these tramway workers, dare to order the police to interfere in the cause of freedom? Certainly not. The police would be withdrawn from action, the tramway companies would be told that they must pay the wages asked, and if they could not afford to do this at present fares the fares would be raised, and the public would have to pay, or the tramway company placed in the bankruptcy court. Or imagine that the tramways themselves were in the possession of the county council, controlled by a progressive majority. Six months before the election the men would be certain to demand a permanent increase of wages—they would be fools if they did not do so—and to threaten defeat at the polls if their demands were not complied with; and the same plan would be adopted by all the other trades concerned. The result would be one gigantic conspiracy, between the quarter of a million or so of workmen employed by the county council, and the members of the council. Wages would be increased year by year. The members would be returned continually by the votes of their own employes, and allowed to recompense themselves for their labors by "boodling the public funds, and the unfortunate rate-payer would soon be reduced to ruin."

AN ELECTRIC HEATER STORY.

The St. Louis Globe Democrat has unearthed an electric heater story that is a little ahead of anything yet told. A section hand from the wilds of Arkansas who had previously fortified himself with a couple of glasses of Tennessee mountain dew, boarded a car in St. Louis and took a seat over an electric heater. As he had paid his fare on entering, but kept looking at the conductor, that official walked up to where he was sitting and asked him where he wanted to get off. "That's all right, pard. May be you don't know that you've got a mighty hot box on this car, for I can feel the heat coming up from right under this seat."



REQUEST ARTICLES.

Articles under this head are prepared at the request of street railway men who have expressed desires to see articles compiled on the subjects taken up.

We give over the space under this head this month to a suggestion which we think is an excellent one, and which, we hope, will meet with a hearty response. As our readers will be aware, we have let slip no opportunity to lay before them all the information available to us on the subjects contained in the suggestions which follow. If such information has been imperfect, it is the fault of the street car managers who have failed to co-operate with us in our attempt to act as a medium for the exchange of ideas of value to the business. It should be said to the credit of American street railway men that they are, as a rule, responsive to requests for opinions and experiences which will help others, but it is a fact that committees of the American Street Railway Association have been very much hampered in preparing reports, by the fact that so few roads out of the total number will respond intelligently to the questions asked of them concerning matters of vital interest to us all, and upon which no intelligent opinion can be formed until a great many replies are received.

The following is from George B. Hippee, general manager of the Des Moines City Railway. We can say from experience that Mr. Hippee practices what he preaches in the way of response to requests for information on special subjects, and we hope that his suggestion will meet with the response that it deserves. It is as follows:

"Would it not be very desirable to call attention in your magazine to the following various questions that interest street railways, taking them up in your magazine and having the different street railway companies comment and exchange opinions on them? It seems to me that we could get at what would be for the benefit of the different street railways, much better by this plan, through a journal such as yours, than we could by sending out circular letters. We have the following topics in mind, which we think it would be a good idea to discuss at different times and see what is to be said by the different companies throughout the country in reference to them.

First. Do you carry the mail? If so, state what your contract is with the government, what your duties are with reference to the carrying of the mail, and what compensation you receive from the government therefor.

Second. Do you run express or package delivery? If so, state fully your methods, what charges you are able to make for such service, whether it is giving satisfaction to the public, and whether it is remunerative to the railway company.

Third. Do you haul freight over your road or any portion of the same? If so, what are the occasions for hauling

such freights? Is it authorized by your charter? State fully whether such freight service is objected to by the public as imposing any additional burdens or obstructions on the streets? Does it give satisfaction to the public?

Fourth. Does your company in any way aid the city in sweeping or cleaning the streets? If so, state whether or not the street sweepings are delivered out of the sweeper into your cars, and where they are taken.

Fifth. Is your company employed by the city in any way in removing manure and garbage from the city and hauling it out into the country and disposing of it to the farmers? Would not such a service be both profitable to the company and the city as well? Give your views on the question.

Sixth. Do you use your railways for sprinkling the streets along which your lines run? If so, state what appliances you use, and how such sprinkling is conducted, and the compensation that you receive from the city or the citizens along the lines.

Seventh. Is your railway in any way used in connection with the fire department for the purpose of hauling hose-carts, hook-and-ladders or other fire appliances to the suburban districts in case of fire? If so, be kind enough to give the methods, and your experience touching the same, and the compensation you receive from the city therefor.

Eighth. Does your company furnish power for local industries along your lines? If so, what are your methods with reference to the same, and what charges do you make for such power?

Ninth. Does your company use its current for heating business houses and residences along the streets occupied by you? If so, how long have you been engaged in such service? Is it satisfactory to the company and the consumer, and what revenue do you derive therefrom?

Tenth. Is your company interested in or engaged in any way in encouraging the running of summer gardens or summer theaters or out-of-door amusements of any kind? If so, state the nature of the amusements you are engaged in promoting, what effect it has upon your travel, do you receive revenues from such amusements over and above the running expenses, and what, in your opinion, is the most popular amusement to be adopted to stimulate travel? Would you suggest that these amusements or resorts should be located near the center of your system, accessible over all the lines of your road, or at the extremity of one or more of them?

If you see it to your interest and the interest of the various street railway companies throughout the country, to take these matters up, we think that you will find that a compilation of such information would be of immense advantage to all the street railways in the country, in that we may be brought in closer touch with our neighbors and gain from each some good points in the manner of operating our roads and increasing our revenues."

Mr. Hippee's letter suggests a very wide field for street railway usefulness, and one which is only partially

covered at present. We believe that it is practicable to cover the field as fully as is indicated. Street railway companies are only beginning to realize the work that it is possible for them to do. The revenue received from such sources would be enough to take many a road out of receiver's hands. Let managers and owners see what can be done along these lines, and let the matter be discussed, that all may be prepared for the fight.

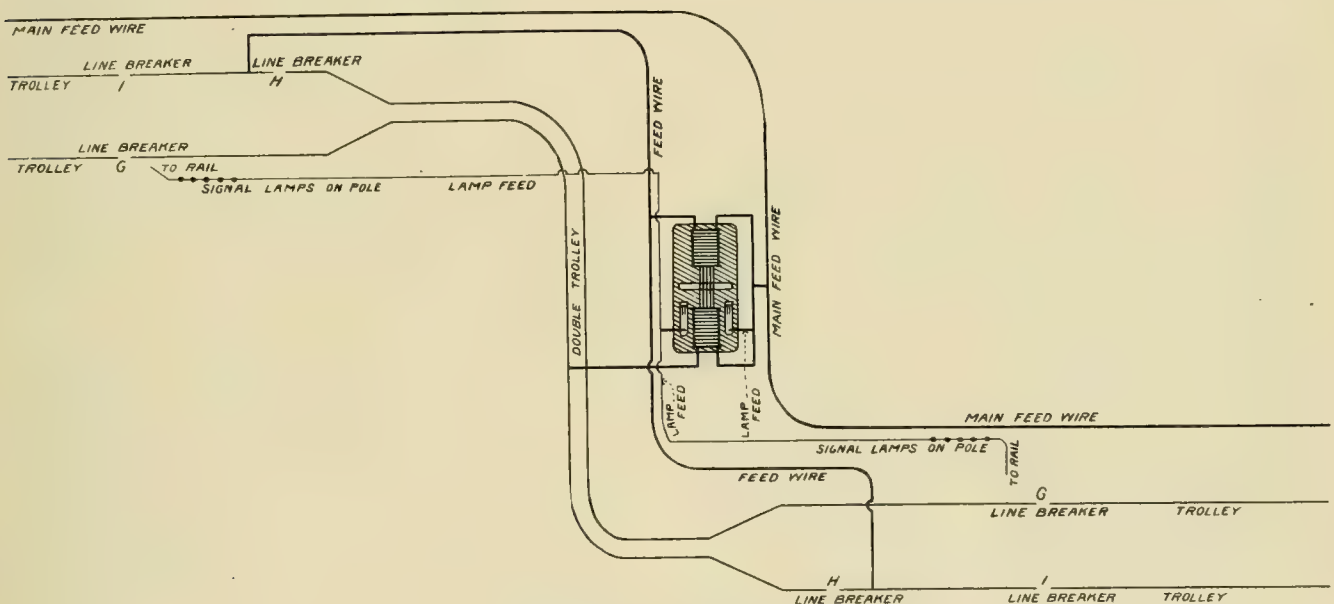
BLOCK SIGNALS AT DENVER.

Through the kindness of S. Roy Wright, superintendent of the West End Street Railway, of Denver, we are able to show the arrangement of a block signal used on that road, at a point where a double track merges into a single track for a short distance. The arrangement was devised by Stephen Connolly, an employe of

his own or some other car coming in the opposite direction is lighting the lamps. If the lamps go out when he throws off the current he knows that it is his own car that is lighting them.

MISPLACED CHARITY.

A business man in Kansas City walks from his residence to his place of business every morning as a constitutional. Soon after leaving home one morning a beggar asked him for five cents that he might get some breakfast. The request was granted, and he quickly disappeared around a corner. The business man continued on his way, rejoicing that he had—temporarily at least—relieved one case of want. Reaching his office building, he was just entering when some one touched him on the sleeve, and turning he beheld the beggar whom he had



BLOCK SIGNALS AT DENVER.

the company. The operation is as follows: As soon as the car passes over the section insulator G, the current used by the car passes through the solenoid B. This draws in the core, making connection across the two brushes and lights both series of lamps. They remain lighted until the motorman uses current between the section insulators H and I, and the core is drawn back by the current in the other solenoid. The objection to this is, of course, that two cars might pass G at the same time, coming from opposite directions, and the lamps would be lit by both cars. Neither motorman would know that the other car was coming until he met it on the single track. This arrangement is used on a grade where the cars do not use current in going one way except that necessary to work the signal. On a level track a similar arrangement is used, except that a spring is put in instead of the top solenoid. A car then has to use current continuously to block the other car, but it has the advantage that a motorman can find out whether

assisted. The man had evidently forgotten his late benefactor and volubly repeated his tale.

"But look here, my man," said the business man, "I gave you a nickel on Oak street not half an hour ago."

"Is that so?" replied the beggar, with an air of surprise.

"Yes, that's so. Why didn't you get some breakfast with that?"

"Well, you see, boss, it's this way, I had to use dat nick fer car fare to get down town to th' cafe where I takes me meals."

Greene Pack, president of the Detroit Railway, died in New York, of Bright's disease. He was born in Peterboro, Madison county, N. Y., August 13, 1843, and had made a fortune in the lumber business. He first entered the street railway field by purchasing stock in Cleveland, and was interested with H. A. Everett, in the new Detroit Railway.

STREET RAILWAY LAW.

EDITED BY FRANK HUMBOLDT CLARK, ATTORNEY AT LAW, CHICAGO.

Interference with Use of Street by Street Railway.

If the construction of an additional track for a street railway company would be an unnecessary obstruction to and interference with the ordinary use of the street, and the track privileges of an existing railroad company are sufficient for the business of two or more companies, they should all be obliged to use them in common; and an injunction to prevent the laying of an additional track may be granted to abutters.

In delivering the opinion of the court, Bartch, J., said: "The rights of access, light, and air, constitute the principal values of such property, and it must be presumed that when lots are sold the grantees purchase them with a view to the advantages and benefits which attach to them because of these easements. The right of the grantee to their use is precisely the same as his right to the property itself. Such privileges are easements in fee—incorporeal hereditaments—and form a part of the estate in the lots. They attach at the time the land is platted and the lots are sold, and will remain a perpetual incumbrance upon the land burdened with them. It follows that, when land is platted by the owner of the soil, and lots sold, bounded by a street designated and marked on the plat, the grantee acquires a right to the street in front of the premises as a means of access. (1 Hare, Const. Law, 376; Lewis, Em. Dom. Sec. 114; Story v. New York Elev. R. Co. 90 N. Y. 122, 43 Am. Rep. 146; Wyman v. New York, 11 Wend. 487; Child v. Chappell, 9 N. Y. 246; Schulte v. North Pacific Transp. Co. 50 Cal. 592; Denver v. Bayer, 7 Colo. 113.)

"Nor does it matter, in this case, that the fee is in the city in trust for the use of the public, instead of in the abutting owner in trust for street uses. Equally in both cases the abutting owners are entitled to the use of the street as a means of access to their lots, and for light and air. If the fee is in the city, the rights of the abutter are in the nature of equitable easements in fee; if in the abutter, they are in their nature legal. In either case the abutters have the right to have the street kept open and not obstructed so as to interfere with their easements, and materially diminish the value of their property. When the lots of plaintiffs were sold under the town site act, above mentioned, it was, in effect, agreed with the grantees that they were entitled to the use of the street as a means of ingress, egress, light, and air. These rights were inducements to purchasers, became a part of the purchase, are appurtenances to the land which cannot be so embarrassed or abridged as to materially interfere with its proper use and enjoyment, and they are, in effect, property of which the owners cannot be deprived without due compensation. By implication, at least, the grantees also assumed additional burdens, for they must contribute of their own funds for the expense of sewer, gas, and water connections, and as well towards the cost of sidewalks, paving, and in sprinkling in front of their

lots. These are expenditures which devolve upon them as abutting owners, and, in addition to the relation of their lots to the street, give them a special interest in the street in front of their premises, distinct from that of the public at large. Assuming such burdens, they may of right make any and all proper uses of the street, subject to proper and reasonable municipal control and police regulations. (Lewis, Em. Dom. Sec. 115; 2 Dill. Mun. Corp. 4th ed. Secs. 556a, 556b; McQuaid v. Portland & V. R. Co. 18 Or. 237; Haynes v. Thomas, 7 Ind. 38; Story v. New York Elev. R. Co. supra.)

"The right of municipalities to grant franchises to private corporations for the construction and operation of street railways, when empowered by the legislature so to do, is not now, it seems, an open question, although streets were originally not designed for that purpose, but were mostly confined to the right of public travel in the ordinary modes. Enlightened public policy, advanced civilization, and a desire to subserve public interest, have induced courts to become more lax in the enforcement of strict technical rules and principles in this regard, and it appears now to be well settled by judicial authority that a reasonable portion of a street may be devoted for the purposes of a street railway, and that such is a proper use of the street.

"Counsel for appellant contend that, subject to special constitutional restrictions, the legislature has plenary power over all public ways and streets. If this position be tenable, then, in the absence of special constitutional restrictions, the legislature may authorize municipalities to devote the entire width of a street to railroad uses, regardless of the property rights of abutting owners, without compensation for injury to their property. This theory does not appear to be sustained by the authorities. The legislature may delegate power over streets to municipalities, but in doing so it must recognize the property rights of private individuals. Judge Dillon, in his work on Municipal Corporations (vol. 2, sec. 656a), speaking of the nature of streets and legislative control, says: 'Public streets, squares and commons, unless there be some special restriction when the same are dedicated or acquired, are for the public use, and the use is none the less for the public at large, as distinguished from the municipality, because they are situate within the limits of the latter, and because the legislature may have given the supervision, control and regulation of them to the local authorities. The legislature of the state represents the public at large, and has, in the absence of special constitutional restraint, and subject (according to the weight of more recent judicial opinion) to the property rights and easements of abutting owners, full and paramount authority over all public ways and public places.' It will be observed that the learned author distinctly recognizes 'the property rights and easements of abutting owners,' and, subject to these, the legislature

'has full and paramount authority over all public ways and public places.' Up to within a comparatively recent date, the current of judicial opinion drew a distinction between cases where the fee was in the abutting owner, subject to street uses proper, and those where the fee was in the municipality in trust for the use of the public. In the latter class of cases it was uniformly held that the power of the legislature to authorize the construction of a railroad on the street of a city was paramount, and that it could delegate such power to the local authorities. Of the exercise of this power the abutting owner could not complain, and had no right to compensation for injury to his easement caused by the appropriation of the street to such purposes. In the former class of cases he was entitled to compensation for the injury sustained by such appropriation. The case of *Indianapolis, B. & W. R. Co. v. Hartley*, 67 Ill. 439, 16 Am. Rep. 624, supports this view. Mr. Justice Scott, in deciding the case, said: 'A distinction has been taken where the municipality granting the right to lay the track owns the fee in the streets, and where the fee remains in the abutting owner, and it seems to us that it rests on sound principle, and is supported by the highest authority.' That case was decided in January, 1873, and such, it must be conceded, was the weight of authority at that time. Then the cases turned upon the question whether the fee was in the public or in the abutter, in many of them without close inquiry as to the exact limitation of the fee; and it was almost universally held that if the fee was in the abutter, the legislature could not authorize a private corporation to construct a railroad on a public street without compensation to the abutter, and likewise it was almost universally held that, if the fee was in the public, the legislature could authorize the street to be used for such purpose without compensation to him. Since then the whole subject has undergone deliberate reconsideration, and the weight of recent judicial decision seems to abrogate the distinction, and treat the easements of abutting owners as property rights, forming part of the estate in the property, except in cases where the public owns the absolute fee of the street, and the fee is not limited to street uses proper. In such cases the tendency is still to hold that the legislature, in the absence of special constitutional restraint, may authorize a railroad company to use the street of a city for its road-bed without compensation to the abutter. It might be observed, however, that even in this class of cases there seems to be no just or satisfactory reason why such a use of a street, which is specially beneficial to the grantee of the franchise, and causes a special injury to the abutter, should be within the absolute control of the legislature, without regard to the property rights of the abutting owner. Speaking of the nature of public streets, and of the rights of the abutter and of the public, Judge Dillon (*Mun. Corp. sec. 656a*) observes: 'The full conception of the true nature of a public street in a city, as respects the rights of the public on the one hand and the rights of the adjoining owner on the other, has been slowly evolved from experience. It has been only at a recent

period in our legal history that these two distinct rights have, separately and in their relations to each other, come to be understood and defined with precision. The injustice to the abutting owner, arising from the exercise of unrestrained legislative power over streets in cities, was such that the abutter necessarily sought legal redress, and the discussion thence ensuing led to a more careful ascertainment of the nature of streets, and of the rights of the adjoining owner in respect thereof. It was seen that he had, in common with the rest of the public, a right of passage. But it was also further seen that he had rights not shared by the public at large, special and peculiar to himself, and which arose out of the very relation of his lot to the street in front of it; and that these rights, whether the bare fee of the street was in the lot owner or in the city, were rights of property, and, as such, ought to be, and were, sacred from legislative invasion as his right to the lot itself.' In support of this view of the question, he cites, among numerous other cases, *Story v. New York Elev. R. Co.* supra, which is the leading recent case in New York on this subject. In this case Justice Danforth, after an elaborate and exhaustive review of the authorities, concludes: 'In whatever way, therefore, we view the plaintiff's case the result is the same—a right of property in the street, with which, until properly appropriated and compensation made, the defendant cannot intermeddle.' (2 Dill. Mun. Corp. sec. 704; *Lahr v. Metropolitan Elev. R. Co.*, 104 N. Y. 268; *Florida Southern R. Co. v. Brown*, 23 Fla., 104; *Mahady v. Bushwick R. Co.*, 91 N. Y., 148, 43 Am. Rep. 661; *Burlington & M. R. R. Co. v. Reinhackle*, 15 Neb., 279; *Cincinnati & S. G. A. R. Co. v. Cummins*, 14 Ohio St., 523; *New York Elev. R. Co. v. Fifth Nat. Bank of New York*, 135 U. S., 433, 34 L. ed. 232; *St. Paul & P. R. Co. v. Schurmeier*, 74 U. S., 7 Wall. 272, 19 L. ed. 74; *Theobald v. Louisville, N. O. & T. R. Co.*, 66 Miss. 279, 4 L. R. A. 739)."

(Supreme Court of Utah. *Block v. Salt Lake Rapid Transit Co.* 24 Lawyers' Reports Annotated. 610).

Death of Infant—Negligence of Parent—Duty of Driver.

A mother who, while talking to friends at the door, leaves her child, twenty month's old, in the kitchen, and allows it to pass her, cross the sidewalk, and go 28 feet to a street railway track, where it is killed in her immediate view, without knowing that it is her child until after the accident, is guilty of negligence which will preclude recovery by her for its death.

A driver of a street car is not *per se* guilty of negligence in momentarily looking to the sidewalk to see whether persons standing thereon desire to get upon the car.

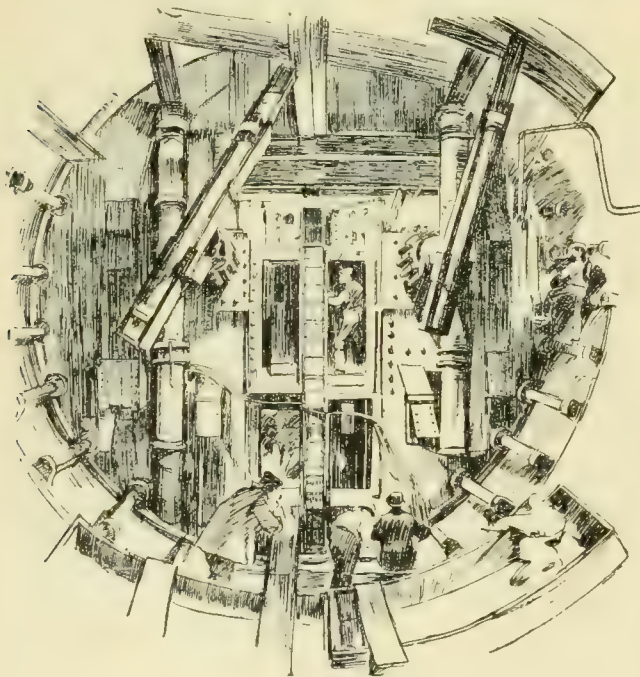
(Supreme Court of Pennsylvania. *Johnson v. Reading City Passenger Railway Co.*, 160 Pa., 647; 28 Atlantic Reporter, 1001.)

Pepper & Register, engineers and contractors, Philadelphia, have removed their offices from the Provident building to 1414 South Penn square.

METHOD OF BUILDING A TUNNEL WHICH MAY BE ADOPTED IN NEW YORK.

Under the Thames, at London, Eng., is now being constructed the Blackwall tunnel, which may well be studied by the engineers who are planning the great proposed rapid transit tunnel in New York City. A four-track railway is considered necessary by the rapid transit commission in New York. Four tracks could easily be accommodated in a tunnel a little larger than the one at Blackwall, which is twenty-seven feet in external diameter, by having the trains run in tiers, two above and two below.

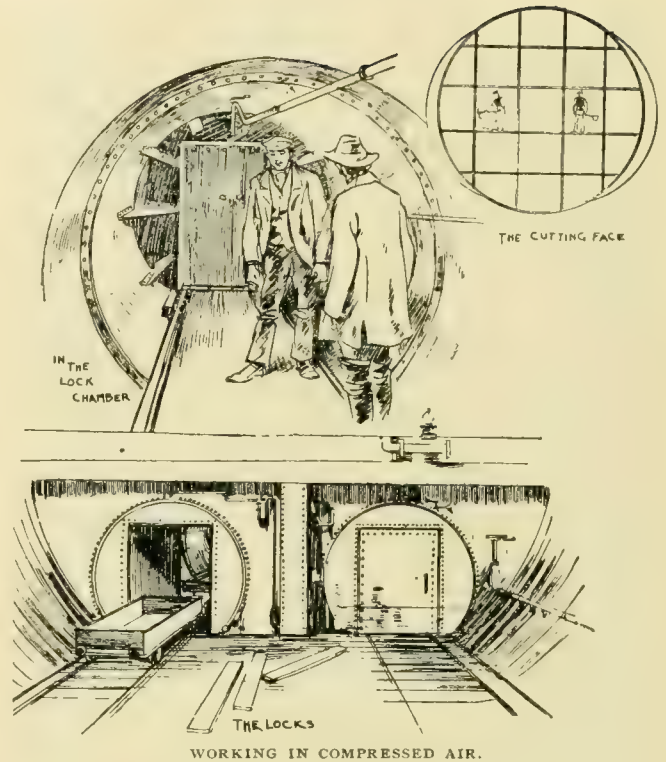
Two methods of working have been followed at Blackwall. One is the ancient "cut and cover" method of excavating from the open air and then covering over. The other and more interesting system is the modern one, employing compressed air and a circular cutting shield forced forward by hydraulic pressure. To place the two cutting shields in position beneath the surface, pits were sunk, one on each side of the river. The pits



BACK OF THE DRIVING SHIELD.

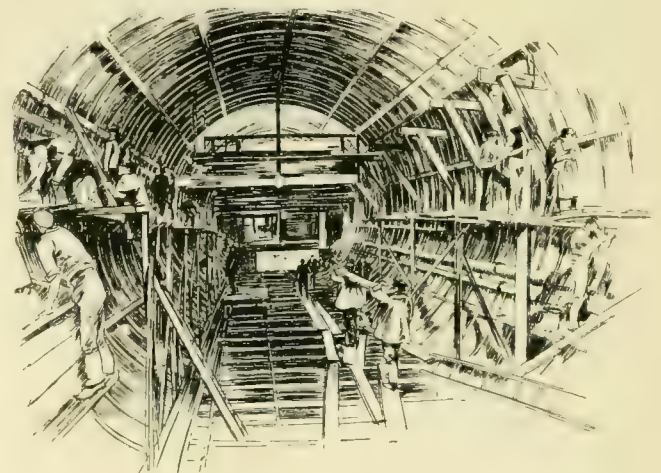
are walled up with a double ring of iron plates, filled in with concrete. In sinking these shafts the first operation is the building of a section of the lining at the surface of the earth. The ground is then dug away from under until the section of lining sinks down, when another section is built upon the first, and the digging and building up of the lining continues until the required depth is reached. The depth of the shaft at Blackwall is over seventy-five feet and the diameter fifty-eight feet. At the bottom of the shaft is a circular opening on the side towards the river, through which the cutting shield was pushed.

Economy of time required for construction was secured by having the cutting shield under construction at the same time that the shaft was being sunk, instead of wait-



ing to put it together until after the bottom of the shaft was reached. The shield was built on a timber framework and weighed 250 tons. When all was ready the dock and shaft were filled with water and the shield floated over the shaft, down which it was lowered by simply pumping out the water.

After the plates covering the circular opening in the side of the shaft were removed, the cutting shield was pressed through it and into the earth by the twenty-eight hydraulic jacks provided for this purpose, each of which could exert a pressure of 100 tons. At the forward end of the shield, men are at work on platforms at different levels, so as to attack the whole face of the excavation at the same time. The earth is thrown into tram cars, hauled to the shaft and elevated to the surface, where it is dumped. At one time a mass of cement-like



INTERIOR OF TUNNEL

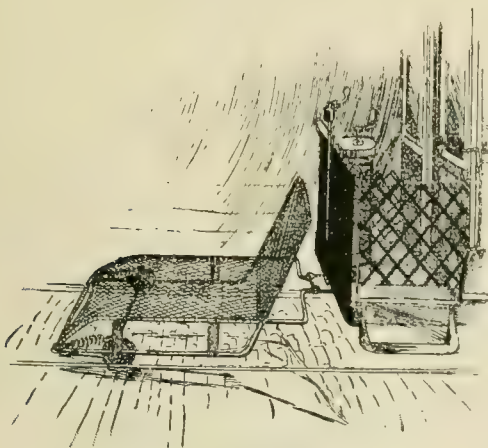
material was encountered. Here the cutting edge of the shield was bent back and crumpled up, causing five months' delay, and an expense of \$15,000. Similar accidents will have to be guarded against, if this method of tunneling is adopted at New York, for there the underlying stratum is rock.

The iron lining of the tunnel is built in the shield as fast as it moves forward, the heavy segments being lifted into position by hydraulic engines. When the excavation has progressed several feet and the lining has been built up an equal distance, the shield is forced forward by the hydraulic jacks, which rest upon the completed portion of the lining.

The presence of water in the stratum under the river bed, necessitated the use of compressed air to prevent leakage into the tunnel. This expedient has proved eminently successful. The pressure of the air, equal to two atmospheres, counteracts the pressure of the water seeking to get in. Should water-bearing strata be encountered at New York, which is very probable, compressed air will be used to prevent leakage, although it is expensive and prejudicial to the health of laborers.

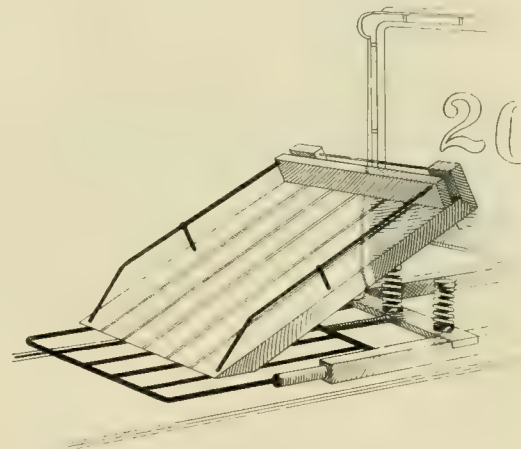
THREE FORMS OF FENDERS.

Car fenders are beginning to be almost as numerous as car starters were a few years ago, and most of them are just as useless as the car starters. Those fenders that come nearest to fulfilling all requirements are lacking in some important particular, usually adding to the car equipped with them a new danger. A Pennsylvania inventor has patented a device consisting of a series of brushes in the form of an inclined endless apron, which revolves and conveys the obstruction from the tracks against the dash. It has an automatic attachment which raises it from the tracks when an object is struck. The invention has not been tested, because the inventor did not want to run the risk of having the secrets of its workings discovered until his patents were secured. While



EWBANK FENDER.

The Ewbank fender shown in this connection is the invention of H. B. Ewbank, a St. Louis boy. The fender is on a truck of its own, and would seem to present an additional pair of wheels to run over objects. It consists of an iron frame work with a special woven wire netting



FALTICK FENDER.

four feet long, extending three feet upward. In front of the curved iron bar at the bottom is a taut rope, which is by means of springs, enabled to change its tension when struck.

Another St. Louis fender, invented by A. E. Faltick, is also shown. It is made mostly of wood and extends about three feet in front of the car. A small rail running across the front is fitted into a piston on each side. When a person is struck the railing gives so as to prevent the breaking of bones, and the person falls on the crib-like screen, the weight causes it to sink down on the frame work, where it is automatically locked.

CURIOUS RESULT OF ELECTRIC CARS.

It is stated by an old time newspaper man of Philadelphia that the introduction of rapid transit by means of electric cars will very likely have an adverse effect upon the circulation of the daily newspapers. When all cars were moved by horses or mules, as the city covers considerable territory, it took a long time to go from one part of the city to another. In order to pass the time habitual travelers bought two or three newspapers, and made themselves as comfortable as possible. With better facilities the distance is covered in so short a time that passengers are compelled to read rapidly in order to finish one paper, which is naturally the favorite. The result is the others are not bought.

There may be something in this yarn, as it sounds plausible. The chief reason why Sunday papers are so voluminous is that people have more time to read on Sunday than on other days, and it is this trait that is the magnet that draws the advertiser, who knows that his announcement will be read. The chief value of the story, however, is that it is an incident in connection with the development of rapid transit

the fender might pick up a person, it would be almost certain to injure him severely by the contact with the dash.



WILL SEAT SEVENTY PASSENGERS.

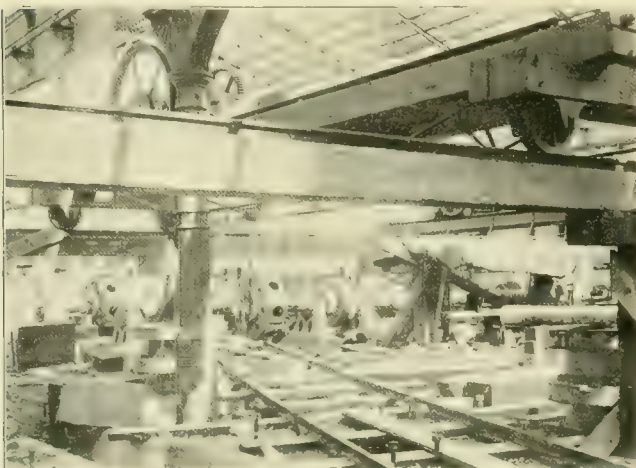
CABLE ROAD EXTENSIONS AT SYDNEY, NEW SOUTH WALES.

Sydney, New South Wales, has a new double track cable road, 12,000 feet long, operated by the Kings Street Cable Tramway Company, connecting the heart of the city with the eastern suburbs. Fares are graded according to distance, being two cents, four cents and six cents; tickets are sold by conductors. In some sections trains stop only at indicated streets to receive and discharge passengers, but in the city stop anywhere. On the down town lines they run under three and four minutes headway, at the rate of eight miles an hour, while in the suburbs they are run at six minute intervals to 6:33 p. m., and after that eight minutes, at the rate of nine miles an hour.

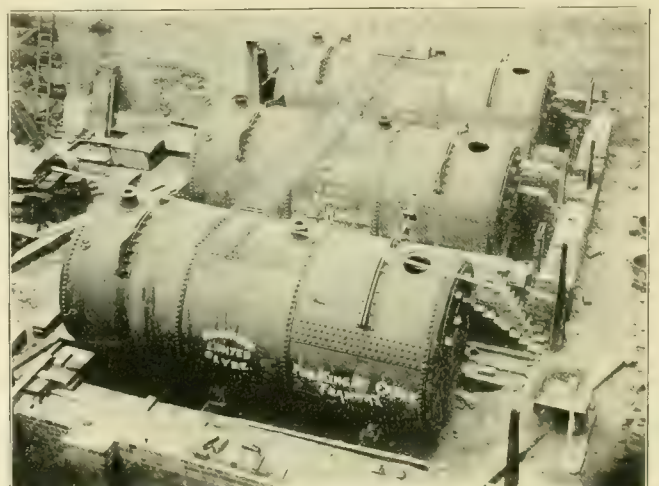
Most of the distance the tracks are parallel, but for a portion of the way, on account of narrow streets, a single track is laid on each of two streets, one being used for outbound and the other for return traffic. The gage is 4 feet 8½ inches, and the steepest gradient one in nine.

The conduits are not very deep, on account of excellent drainage through the sewers. Hudson Brothers, L'td, had the contract for the machinery and most of the iron work; Justin M'Sweeney, permanent way; Clark & Beck, power station and car shed.

The building which was designed by Gustave Fischer, M. I. C. E., supervising engineer of the Tramway Construction branch of the Works department, contains the engine room, 194 feet by 99 feet; car house, 196 feet by 87 feet; boiler house, 59 feet by 45 feet. Offices, reading room, lavatories and other conveniences are provided. A view is presented, showing the interior of the power house, illustrating the shafting, which is steel, 14 inches in diameter, swelled to 16 inches diameter in wheels and 15¾ inches in couplings. The three boilers were furnished by Hudson Brothers, L'td, Clyde, Australia, and are 16 feet long, 7 feet in diameter, ⅝-inch shell, in three plates, ¾-inch thick at ends, with eighty tubes, 4 inches in diameter, supplying steam for two sets of compound engines, each of 1,000 horse-power. There are two sets of cables, each 5 miles long, weighing 33 tons, and made



INTERIOR POWER HOUSE.



BOILER PLANT.

by the White Cross Company, England. The grip cars and trailers were made by Hudson Brothers, L'td, Clyde, Australia. The car shown herewith has a smoking compartment, and capacity for seating seventy passengers. When loaded it weighs 19 tons.

ELECTRICITY SUPERSEDES STEAM.

Steam railroad men are studying with interest the experiment of the New York, New Haven & Hartford Road which is equipping its Nantasket branch as an electric line. It is believed that if this venture is successful other branches of this railroad system will be converted into electric lines, and that other feeders for the main line will be constructed. Col. N. H. Heft, president of the Bridgeport Traction Company, Bridgeport, Conn., has charge of the construction. President Charles P. Clark, has long been investigating the subject of electric traction, and has decided that it is worth while to try the experiment. He says:

"The Nantasket Beach Railroad is a short branch line, about seven miles in length, perfectly level, and reasonably straight, and is used principally in the summer business, which varies with the weather and with the season. The transportation problem is somewhat complicated by the fact that from one end of this branch are received large excursion trains almost daily in July and August, and from the other end large crowds who come down from Boston by boat and land at Pemberton. The business derived from these two terminals of the branch line is supplemented by a considerable amount of short riding, for the sake of riding, along the beach. Occasionally an additional draft is made upon the railroad by reason of fog, when the boats that come from Boston are unable to return, and 5,000 or 10,000 people have to be carried by rail to the city on short notice.

"The situation of this branch is exceptionally favorable as a place for experimenting as to the use of electricity as a motive power, and the company is now engaged in fitting up this seven miles for electrical use. We have contracted for two Green engines, each 820 nominal horse power, and for eight horizontal tubular boilers with return flue; two direct coupled generators, 500 kilowatts each, made by the General Electric Company. We propose to use a 0000 copper trolley wire with naked feed wires carried upon iron arms bolted to southern pine poles, 30 feet in length, 12x14 inches at the bottom, and 10x12 inches at the top. These poles are to be located between the tracks, which are being laid to 13 feet centers. The electrical equipment is to be made interchangeable with our standard cars, and at first will consist of six motor cars, two motors to each car of 100-horse-power nominal capacity. These are expected to draw with ease a trailer car. Both these motor and trailer cars are fifty feet in length, open, and lighted with electricity, and entered from the side. In addition to this we are preparing four baggage cars, thirty feet in length, of which two are to be fitted with two motors each and two with four motors each, all of the General Electric Company's

construction. By loading these baggage cars, and so increasing their tractive force, we expect to determine the efficiency of special motors. This is the extent to which this company expects to go at present, but from the experience derived during this summer (for the road is contracted to be in working order some time in the month of May) we shall be able to determine upon what other branches or parts of our system transference of steam power by the electric current may prove efficient and economical.

"In discussing the subject with various electrical engineers and companies we find that we are working in a somewhat unknown field, and must proceed cautiously, although the physical condition and grades of this branch line, the nature and volume of the travel over it, and its use in summer only, make it less of an experiment than to equip graded, hilly, all-the-year-around roads, on which the traffic is limited."

SKATING RINKS AS REVENUE PRODUCERS.

PART IV.

Even in Atlanta skating has helped to increase the revenue of the street railways. On the 10th of February the Atlanta Consolidated Street Railway Company's cars carried signs, which informed the public that there was skating on the lake at Ponce de Leon. Visitors to the convention will remember that beautiful spot, which will be associated with the barbecue. During the day the cars were crowded with people going out either to skate or to see others skate, which was a novel sight, as we were told most of the year it is uncomfortable in Atlanta houses unless the doors and windows are left open.

It is estimated that several thousand people were gathered on the shores of the lake to watch the novel sight, for many had never seen the graceful movements of skaters as they glide over the ice. It was surprising that so large a number were proficient in the sport, for the ice was comfortably crowded all the time. Several fancy skaters tried to recall their youthful accomplishments and succeeded in entertaining the populace with intricate and astonishingly executed figures.

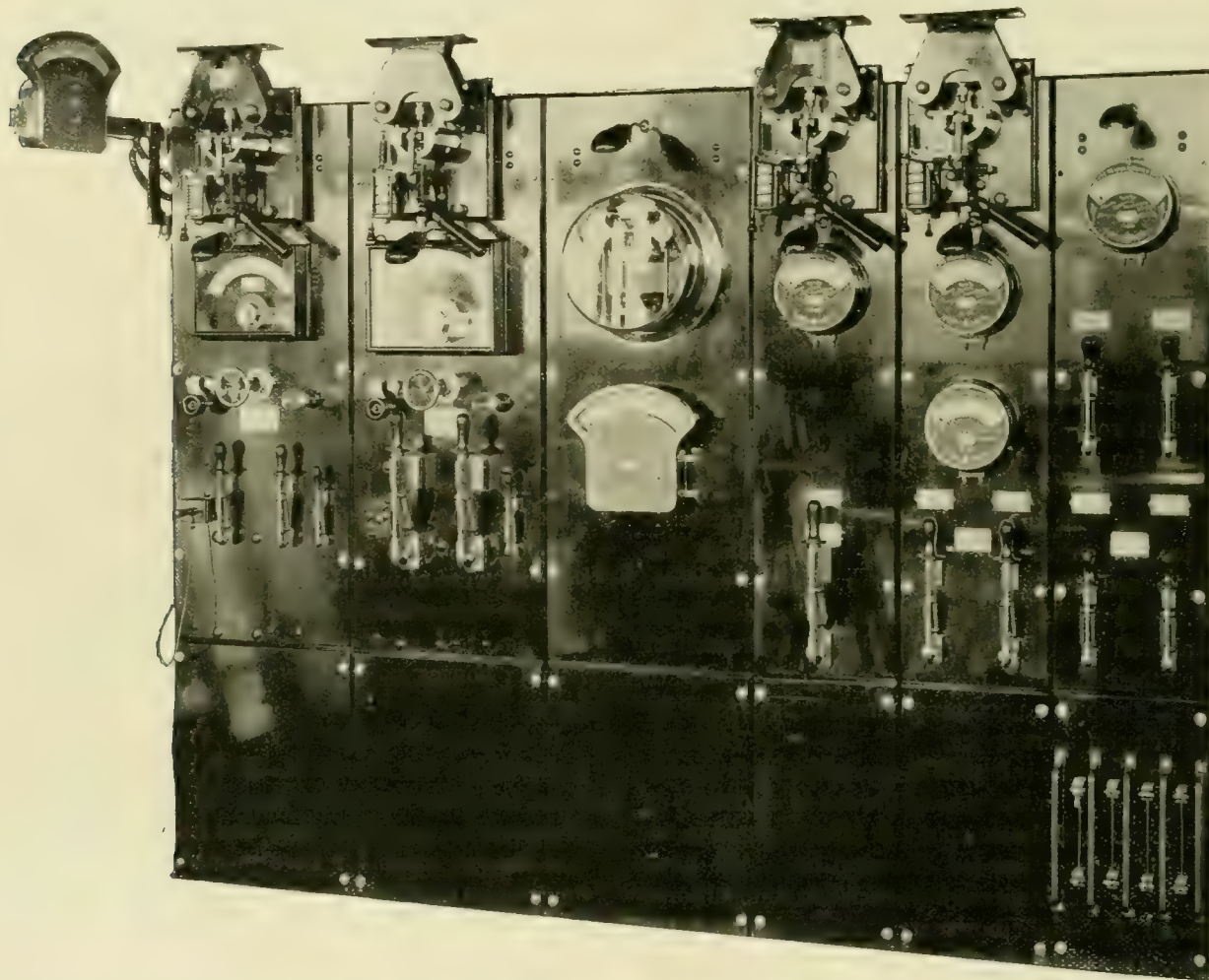
What amazed everybody was the number of skates, that appeared as if by the command of a magician. Some of them were brought by northern sojourners, who probably wondered why, until the freeze-up. The others had probably been kept for years by the owners, patiently awaiting an opportunity to use them, which was not allowed to slip when it came, for there were almost as many learners as skaters on the ice.

The moral is that if a street railway as far south as Atlanta can produce revenue from skating, the northern cities can surely make it pay. The REVIEW has published several articles on this subject, showing large profits at small expenditure. The preceding article in the February number is a practical demonstration of the utility of the plan.

GENERAL ELECTRIC SWITCHBOARD PANELS.

Like everything else, the railway station switchboard has undergone a gradual evolution. The street railway power plant engineer has decided in favor of the "panel" board, which is in reality a number of independent boards, each one containing all the apparatus necessary to control a generator or a feeder, as the case may be. The accompanying engraving shows the latest designs of the engineers of the General Electric Company in the way

between generator lead and ground, and the small air gap is a much weaker di-electric than the insulation of field and armature. The magnet is connected between the generator and line, and the induction of its windings affords additional protection to the generators against lightning. The field rheostat for controlling the potential due to the shunt field is placed at the back of the panels, and is of the Carpenter enamel type. It is operated by a hand wheel on the front of the panels. A discharge resistance of 500 ohms is attached to the field rheostat to cushion the discharge when the field switch is



GENERAL ELECTRIC SWITCHBOARD PANEL.

of switchboard panels. Two sizes of generator panel are shown at the left, and three feeder panels at the right. For panels of 1,000 amperes and less the Thomson-Houston type of ammeter is used. It has a damping arrangement, which renders the needle almost dead beat. For larger panels, the Weston illuminated dial ammeter takes its place. The main switches are single pole quick break, the positive and negative being mounted on the panel. The equalizing switch is put on a pedestal near the generator, according to the plan explained in our issue of August, 1894. The lightning arrester is type I R, and consists of an iron clad electro-magnet, in the field of which are two carbon points, separated by a one-third-second-inch air gap. The points are connected

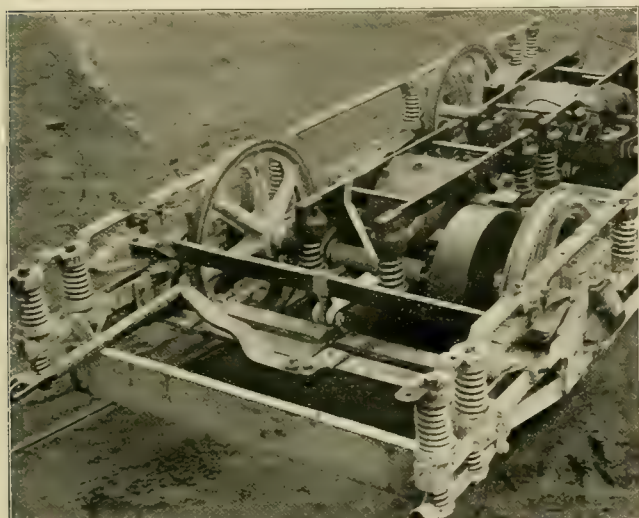
opened. It is connected in series with a pilot lamp on the front of the panel. The field switch for the shunt field of the generator is of the regular three point type, and is set to the left disc of the main switch. The lighting switch is single pole, 100 ampere capacity, quick break, placed at the right of the main switch on each panel, and connected to the negative terminal of its generator, between it and the negative main switch. The positive side of the lighting circuit is connected through a magnetic cut-out to the equalizing bus, and current may be supplied to lights from any generator, whether its circuit breaker or main switch is open or closed. The voltmeter is a Weston illuminated dial instrument, mounted on a swing bracket at the left or

right hand side, near to the top of the panel. It is connected by the insertion of a plug in the four point receptacle on the front of the panel. Two of the points are connected to the terminals of the generator, between it and the main switch, the other two to the bus bars of the voltmeter. The feeder panels for higher loads are equipped with automatic circuit breakers, ammeters, and quick break switches. In those for lower loads, fuses may be employed.

In the center of the group of panels is a total current panel, with recording watt meter and main ammeter.

TERRE HAUTE MOTOR SUSPENSION.

In our December, 1894, issue we described a form of motor suspension, which our progressive friends of the



TERRE HAUTE MOTOR SUSPENSION.

Terre Haute Electric Railway originated. We are now able to show the latest form of suspension used on that road, as designed by President Russell B. Harrison and Superintendent M. F. Burke. These gentlemen are not in the habit of following the beaten path when there is an object to be gained by leaving it, and the motor suspension presented in the accompanying engraving is the result of their efforts to improve on the orthodox method. Their success can be judged by our readers. The suspension bars, instead of being supported on spiral springs, resting directly on the truck frame at the ends of the truck, are pivoted in the manner shown. It is a very neat and simple suspension, and coming, as it does, from a company which has been the originator of several novelties in the methods of suspension of this type of motor, it is to be looked upon as something of value to the trade.

The Detroit Railway Company has given the Cambria Iron Company, Johnstown, Pa., the contract for forty-five miles of track for \$170,000, and special work to the Cleveland Frog & Crossing Company for \$48,600. Deliveries must begin in April.

DID YOU EVER THINK OF THIS?

I was walking up F street with Dr. Bedloe, the well-known Philadelphia wit and raconteur, the other evening, writes a Washington correspondent. He said he was going after a florist. I told him there were two nearer than the one he was looking for.

"I am seeking this man," said the doctor, "because he advertises in the newspapers."

"Cheap flowers?"

"Not at all; because the man who advertises in the newspapers is always up to the times, and he is easier to deal with. You laugh but I tell you it's a fact. I have studied this over, and I know from personal experience. For the last few years of my life I've made it a rule never to deal with any business man who doesn't advertise. I wanted some flowers to send off in a box by mail, and I looked in the paper this morning for the advertisement of a florist. Now, you see, he wants to deal with me, else he wouldn't put that in the papers. I don't know any of the places here; but the rule is a good one, and I'll bet you anything you say that I can get what I want at this place and get it cheaper than anywhere else, or at any flower place that keeps its name out of the newspapers. The business man who doesn't advertise almost invariably cheated me, on the theory, I presume, that I'd come there anyhow—or that his reputation was made and he could do what he pleased. I have always found such a man narrow-minded, selfish, non-enterprising, penny wise and pound foolish, even if he didn't cheat me outright."—Stoves and Hardware Reporter.

POKED HER BETWEEN THE EYES.

As a Broadway cable car turned the corner at Fourteenth street, a man who was standing at the door, was jerked off his feet. In the struggle to regain his equilibrium the man struck a woman just between the eyes with the point of his elbow. With a piercing shriek the woman sank back unconscious. The man did not know what to do. He was stammering excited apologies when it occurred to him that the best thing he could do was to get away. The other passengers applied themselves to the task of reviving the unconscious woman. She came to after three or four minutes, but had a big lump on her forehead. After the car was again in motion many criticised the unlucky man for running away. A sensible man on the rear platform remarked, however: "It seems to me that he did the best thing for himself. If he'd stayed he'd have got an awful roasting, and what good would apologies do him? I think he was real foxy, myself." The conductor and the other male passenger on the rear platform said they thought so, too.

The Boise Rapid Transit Company, Boise, Idaho, wants to buy pinions, armatures, commutators and extras for repairing electric cars. George D. Ellis, general manager, is anxious to get quick action.

date and time the articles were found. These are recorded in a book kept for this purpose, and deposited in a closet, or, if valuable, in a safe, awaiting the claimant or owner. Careful inspection of each article is made for a trace of the owner, who is duly notified when there is any means tracing the loser, to call at the office, identify, and obtain the property.

"Every few months the accumulation is disposed of, worthless articles thrown out, and the more valuable put away for a longer period. These, if unclaimed in a period of twelve months, are sent down to the treasurer's office, turned into cash, and credited to unclaimed money or property account. The articles are more varied than valuable. Second-hand (sometimes third-hand) umbrellas, parasols, muffs, satchels, containing valuable documents or a change of underwear, parcels, sometimes containing valuable dry goods, and sometimes a limburger lunch, walking sticks of every style, bracelets, false teeth, surgical instruments, pieces of sewing machines, life preservers and love letters. As a rule people carry their cards in their pocket-books (a very good practice), which enables us to find a large percentage of the losers."

A PHILADELPHIA STREET CAR COMEDY.

The monotony of a Market street cable car's trip was broken by a little comedy in which a Chinaman and a drunken man played the leading roles. There were no vacant seats in the car when the Chinaman entered at Ninth street, and the gentleman with the jag, imagining in his dazed condition and with his defective vision that the quaintly garbed Celestial was a woman, arose from his place. Touching the Chinaman on the shoulder, he lifted his hat, remarking in rather uncertain tones: "Low me offer sheat, madame." The Chinaman readily obliged him, and sat down, while "a smile that was childlike and bland" stole over his features. Several passengers who had noticed the incident, burst into a roar of laughter, much to the disgust of the chivalric gentleman with the jag, who made several ineffectual attempts to explain that he was the only gentleman in the car.

SUED A GUARANTEE ACCIDENT COMPANY.

Suit for \$1,200 has been brought by the People's Electric Railway Company, Springfield, Ill., against the American Employers' Liability Insurance Company, New York. The decision, when it is reached, will determine whether such companies or the street railway companies are liable for court costs and compromises in personal injury cases, which do not come to trial.

The insurance company agreed to stand losses by reason of damage suits for personal injuries against the street railway company brought during the year beginning October 11, 1892, and ending October 11, the following year. For \$800, the liability company agreed to secure the street railway against damages not exceed-

ing \$5,000 to the person or property of one person, and not exceeding \$15,000 for damage to person or property of two or more persons. The street railway company was to contest all suits, but the insurance company was to settle, if the case was lost.

On the night of March 9, 1893, O. A. Brookshire stepped in a mass of fallen live wires, and was injured. He sued for \$5,000, and the jury disagreed twice. The third time the case came up for trial, it was compromised for \$500 and costs, as Brookshire's witnesses had disappeared. When demand was made on the American Employers' Liability Insurance Company for the payment of the claim, payment was refused, on the ground that no notice had been received, and it was therefore not liable.

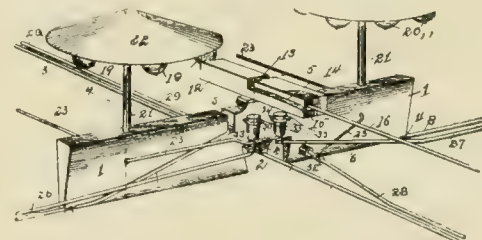
IMPROVED EAR AND CROSSING SIGNAL.

Inventors are bending their energies to do away with solder in overhead and other work. This is the special feature of many devices, and has the great advantage of saving time and expense. A new ear is on the market known as the Eureka improved ear, manufactured by the



Eureka Electric Manufacturing Company, St. Louis, Mo., and sold by the various supply houses as well as by the manufacturers. The manufacturers consider it the best hanger in use, and say it can be put up in five seconds by one man, as no solder is required. It is made in three sizes of brass or malleable iron, and the manufacturers say it will outlast any hanger on the market, having the additional advantage of low price. Any dog will fit these ears, and the roads using them report good work.

The Eureka Electric Manufacturing Company also



ELECTRIC CROSSING SIGNAL.

manufactures an electric crossing signal, composed of a battery of five lamps fastened under a hood suspended above the street on a level with the trolley wire. When a car is within 125 feet of the crossing all the lamps are lighted at once, and are not extinguished until the car has passed the crossing. The manufacturers say the signal can be operated at little expense, and is the only signal yet invented that is in any way practical. It not only acts as a signal to approaching trains, but also lights up the roadway below, showing the approaching motorman whether there are trucks or persons on the crossing.

Employees' Reading Room

PART III.

In the large cities the importance of reading rooms for employes is appreciated by the street railway companies that have tried them. Many of the officials have been amazed at the results, which have come by a natural and almost unobserved development. The men, while well pleased with the rooms, endeavor to increase their usefulness by organizing societies, which meet at stated intervals to listen to papers on a technical branch of street railway work, which are discussed in a manner in which few papers are reviewed, because those who have listened to them are thoroughly acquainted with details, although their knowledge may not be classified. The REVIEW would like to hear from these societies, in order to describe their meetings in this department.

The West End Street Railway Company, Boston, is a believer in reading rooms. General Manager C. S. Sergeant writes: "We furnish all our station lobbies with reading matter, such as Puck, Judge, Harper's Weekly, Scribner's, Harpers', Munsey's the various street railway papers, etc. The rooms are well lighted, cleanly kept, and the reading matter should be, and I think is, appreciated by our employes. These rooms are under the supervision of the different division superintendents and their foremen at the various stations.

"There are two benefit associations among our employes, and one social club. The oldest organization is the Metropolitan Mutual Aid Association, which has for its object the relief and succor of such of its members as may be suffering from sickness or disability, and pays its members \$5 per week during such sickness or disability, after the first week. This was organized in 1882, and its average membership in 1894 was 432. It has paid out in sick and death benefits over \$10,000 since its organization.

"The second benefit association is the Mutual Benefit Association of Division 3. It was organized in January of 1894, with a membership of twenty-five. Its object is similar to that of the Metropolitan Mutual Aid, and pays \$5 per week for twelve weeks in case of sickness or disability. The members are assessed \$1 to help pay the funeral expenses of members. It now has a membership of about seventy, and has paid out something over \$100 in sick benefits since its organization. It has about \$650 in its treasury.

"In the fall of 1893 an organization was formed called the West End Street Railway Association among the mechanical, electrical and clerical departments of the road, its object being social intercourse and entertain-

ment. This association has now a membership of about one hundred and fifty members. Its meetings are held monthly, at which some entertainment is provided, either in the form of a lecture by some of its members on some branch of the railway business in which he is familiar, or an expert, or by amateur theatricals, musical entertainments, etc. These meetings have been well attended, interesting subjects have been discussed, and, without doubt, considerable general information gained by the individual members."

This company subscribes for 70 copies of the REVIEW for its officers and reading rooms, and 53 employes of the company subscribe as individuals.

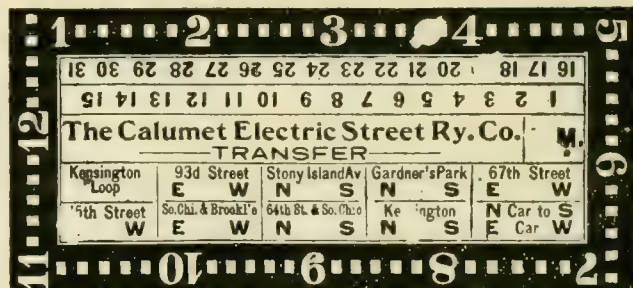
AN ORIGIN MARK FOR TRANSFERS.

When a large road gives transfers at nearly all intersecting points, it becomes a study to prevent passengers from making the circuit of the system for one fare. The Calumet Electric Street Railway Company, of this city, gives transfers at all of its numerous intersecting points, and before the present system of origin marks was inaugurated the company found that some people would spend their Sunday afternoons riding on the cars, all that was necessary being one fare to start with. The system of origin marks is very simple and involved no change

585412

Good for destination as punched on next connecting car if used within 30 minutes from the time issued, on date punched, when presented at point of intersection with this line, subject to Rules of this Company.

Issued by
Cond.



ORIGIN MARK FOR TRANSFERS.

in the form of transfer. In issuing a transfer the conductor punches out the route of his own car, as well as the route and direction of the car to which the transfer is given. The engraving represents a transfer issued by the conductor of a Kensington car to the Seventy-fifth street line going east. He has accordingly punched out E in the Seventy-fifth street space. To indicate the origin he punched in the centre of the Kensington space. This origin mark follows the passenger as long as he travels on transfers, and as soon as he tries to work his way back to the starting point he is denied the transfer privilege. Passengers must ask for transfers when fare is collected.

NEWS FROM THE CITIES

Alabama.

ANNISTON, ALA.—Howard W. Sexton proposes to build an electric line.

DECATUR, ALA.—It is reported that the Decatur Street Railway Company will change to electric.

Arkansas.

PINE BLUFF, ARK.—The Citizens Street Railway Company is contemplating a change to electricity.

California.

SAN DIEGO, CAL.—George B. Kerper has bought the San Diego Cable Railway Company.

HAYWARDS, CAL.—Felix Chappellet has revived his plan to build an electric road to San Jose.

SAN FRANCISCO, CAL.—It is reported that the Market Street Railway Company will construct an electric line on Market street, and make other electric extensions.

OAKLAND, CAL.—The Consolidated Piedmont Cable Company's property will be sold under the foreclosure of a mortgage for \$1,000,000 in favor of the San Francisco Tool Company.

LOS ANGELES, CAL.—Bondholders have taken possession of the Los Angeles Consolidated Electric Railroad Company on account of default in payment of six months' interest on \$3,000,000 of bonds.

LOS ANGELES, CAL.—New officers have been chosen by the bondholders of the Los Angeles Consolidated Electric Railway Company. The cable and horse car lines will be equipped with electricity.

ONTARIO, CAL.—The Ontario Electric Company has been incorporated with \$100,000 capital, \$95,000 subscribed, to install a lighting, heating and power plant, and electrically equip the Ontario & San Antonio Heights Railroad. It is in the market for a power station, to be operated by water power, about eight and a half miles of line equipment, poles, wiring, new cars, motors, etc., generators for railway and lighting, arc and incandescent, and electrical cooking and heating apparatus. Charles Frankish is managing director.

Canada

HALIFAX, N. S.—The stables of the Nova Scotia Power Company burned.

KINGSTON, ONT.—The Kingston & Gananogue Electrical Railway Company will apply for a charter.

PETERBOROUGH, ONT.—The Peterborough & Chemong Park Railway Company has applied for incorporation with \$100,000 capital. Pousette & Gurd are attorneys.

Chicago.

CHICAGO.—The Chicago North Shore Electric Railway will extend its line to North Evanston.

CHICAGO.—The Calumet Electric Railway has been granted a franchise for a loop at West Pullman.

CHICAGO.—The Ogden Street Railway Company has secured franchises for several miles of electric road.

CHICAGO.—The Chicago Electric Transit Company has been granted a franchise in Belmont avenue. It is one of the Yerkes' system.

CHICAGO.—The Calumet Electric Street Railway Company has filed a mortgage to secure an issue of \$3,000,000 gold construction bonds.

CHICAGO.—The Kramer Electric Manufacturing Company has been incorporated with \$100,000 capital, by Edward Kirch, Frank A. Kramer, Max C. Krueger.

CHICAGO.—The Brandenburg Under-Car Electric Company has been incorporated with \$5,000,000 capital. George Pfeiffer, local manager of the German-American Investment Company, is president.

CHICAGO.—An ordinance permitting the Chicago & Jefferson Urban Transit Company to use the trolley in place of the electric conduit, was adopted. This is the company which laid tracks on West Monroe street.

CHICAGO.—The city council granted a franchise to the Cosmopolitan Electric Company to operate electric lights, electric street railways, telephones, telegraphs, heating appliances, and everything that can be operated by electricity. It is reported that the Standard Oil Company is behind it.

CHICAGO.—The car barns of the Chicago North Shore Electric Railway were burned, causing a loss of \$60,000. The loss in equipment was as follows: One motor car; four open trailers; four closed trailers, belonging to the North Chicago Street Railroad; the electrical equipments for ten cars (not including motors), and all the supplies carried in the store rooms.

Colorado.

DENVER, COL.—The Denver Tramway Company will build an emergency plant.

DENVER, COL.—The city in connection with the Denver Tramway Company will build a bridge.

FLORENCE, COLO.—The Florence Belt Line Railway Company has been incorporated with \$25,000 capital, by E. M. Weil, L. Seiss, Leon Seiss, C. L. Huff, James H. Crandall.

Connecticut.

HARTFORD, CONN.—The Winsted Street Railroad Company has applied for a charter.

NEW HAVEN, CONN.—Franklin Farrell bought the plant of the Ansonia Electric Company at master's sale for \$41,444.

BRIDGEPORT, CONN.—Col. N. H. Heft, president of the Bridgeport Traction Company, will have entire supervision of the installation of electricity on the Nantasket Beach division of the New York, New Haven & Hartford road.

District of Columbia.

WASHINGTON, D. C.—The Eckington & Soldiers' Home Railway Company has been given permission to equip four miles of its line with the conduit system of the Electro-Magnetic Traction Company.

WASHINGTON, D. C.—The new owners of the Georgetown & Tenallytown Railway Company have elected these officers: Oscar T. Crosby president; Charles A. Lieb, vice-president; H. F. Purdy, secretary and treasurer. Directors, Oscar T. Crosby, Charles A. Lieb, H. F. Purdy and T. C. Daniel, of New York; F. H. Clark, J. Hite Miller, George E. Emmons, H. Bradley Davidson, and H. M. Earle, of this city.

Florida.

PALMETTO, FLO.—The Palmetto Terminal Company is receiving bids for eight miles of electric railway.

Georgia.

AUGUSTA, Ga.—T. B. Green has leased the Augusta Railway for one year.

ATLANTA, GA.—Steps have been taken to foreclose a mortgage held by the Baltimore Trust & Guarantee Company against the Atlanta Traction Company.

ATLANTA, GA.—The Atlanta Electric Power Company is arranging to develop 45,000-horse-power at the falls of the Chattahoochee river near Atlanta. J. H. Vail, 39 Cortlandt street, New York, is the engineer.

ATLANTA, GA.—The Dixie Intramural Railway Company will build one and one half miles of electric road in the cotton states international exhibition grounds. I. Y. Sage is president, and T. H. Martin, secretary. Ten or twelve cars will be run.

Illinois.

JOLIET, ILL.—The Joliet Street Railway Company is applying for extensions.

GALESBURG, ILL.—Petitions are being circulated for right of way for an electric road to Knoxville.

VENICE, ILL.—Frank McCambridge and C. H. Sharman have been granted an electric road franchise.

EAST ST. LOUIS, ILL.—The St. Louis & East St. Louis Electric Railway Company will extend its line.

PEORIA, ILL.—John C. White, promoter, says the franchise for the new electric road will be completed.

CAIRO, ILL.—Edward A. Buder has been appointed receiver of the Delta Electric Power, Light & Street Car Company.

JACKSONVILLE, ILL.—The Los Angeles Traction Company has been incorporated with \$100,000 capital by Thomas J., Francis and Marcus Hook.

EAST ST. LOUIS, ILL.—The Fuller Electric Engineering Company has been incorporated with \$30,000 capital, by George W. Ross, Martin H. Kilgallen and William B. Ewing.

DIXON, ILL.—The Rockford & Dixon Electric Railroad has been granted right of way through Lee and Ogle counties. Jason C. Ayres, Dixon, says work will be pushed this season.

SAVANNA, ILL.—The City Street Railway Company has been incorporated with \$25,000 capital, by W. W. Cargill, James B. Canterbury, Edwin B. Magill, A. D. Appleby and B. Pulford.

LITCHFIELD, ILL.—Fred Strigel, Fritz Vesper, Henry Fischer, Henry Buchterkirchen, Fritz Germes, Staunton; Col. W. Neimier, John Krausbraar, Mt. Olive; A. Neuber, Carl Meier, Litchfield, are organizing to build an electric road.

ELGIN, ILL.—An arrangement has been made whereby it is expected that creditors outside of Chicago of the Dundee Rapid Transit Company will accept 60 cents on the dollar for their claims, and the machinery claimed to have been borrowed, returned.

Indiana.

VALPARAISO, IND.—It is reported that Chicago, Valparaiso and Hobart capitalists are contemplating an electric road to Chicago, the principal backers being milk shippers.

Iowa.

SIoux CITY, IA.—D. M. Robbins bought the Sioux City Elevated road for \$50,000. There were twenty-one bids.

BURLINGTON, IA.—The Burlington Electric Street Railway has been bought by E. C. and Charles Walsh, of the Burlington Electric Light & Steam Supply Company. The line will be extended.

Kentucky.

LOUISVILLE, KY.—The Louisville City Railway Company will extend its electric lines.

MONTICELLO, KY.—F. H. Bagby, J. A. Brown and J. W. Tuttle are interested in an electric railway to Burnside.

BOWLING GREEN, KY.—Arrangements are expected to be made this week for converting the horse railway to electric, and extend it 5 miles with 60-pound rails.

Louisiana.

NEW ORLEANS, LA.—The Orleans Railroad Company is ready to let contracts for changing its line to electric.

NEW ORLEANS, LA.—E. M. Hudson is attorney for eastern capitalists who are seeking an extensive electric railway franchise. The ordinance is before the council.

NEW ORLEANS, LA.—The city engineer is preparing specifications for the sale of a franchise to operate a steam or electric road over the Ponchartrain Railroad, whose charter expired three years ago.

Maine.

BURNHAM, ME.—The Waldo & Somerset Railway Company will extend its line to Sandy Bay.

AUGUSTA, ME.—A bill has been introduced to incorporate the Wells Beach & Ogunquit Electric Railway Company.

SKOWHEGAN, ME.—The Somerset Traction Company has contracted for rails and will construct its electric line this season.

ELLSWORTH, ME.—The Rockland & Ellsworth Steamship Company is reported to be interested in a proposed electric railway.

PORTLAND, ME.—On August 1, the Portland Railroad Company expects to have its new extensions completed. A new power house, with 1,750 horse-power, will be built, and new cars.

Maryland.

BALTIMORE, MD.—The Baltimore Traction Company lost four cars and two old snow sweepers by the burning of frame car sheds.

Massachusetts.

HANOVER, MASS.—The Hanover Street Railway Company will build four miles of road.

TAUNTON, MASS.—The Dighton, Somerset & Swansea Company has its specifications ready.

NATICK, MASS.—The Natick & Cochituate Street Railway Company will extend its line to Wellesley.

PALMER, MASS.—The Palmer & Monson Street Railway Company has been organized with \$60,000 capital.

SWANSEA, MASS.—The Dighton, Somerset & Swansea Street Railway Company has applied for a franchise.

NEWTONVILLE, MASS.—The car house and eleven cars of the Newton & Boston Street Railway Company were burned.

ATTLEBORO, MASS.—E. R. Price has been granted a franchise to operate cars over the old Attleboro, North Attleboro & Wrentham tracks.

CANTON, MASS.—Stock subscriptions are being received by the Canton & Sharon Electric Railway Company, which will have \$50,000 capital.

BOSTON, MASS.—J. H. Bickford has petitioned the legislature for a franchise for the Metropolitan Elevated Railway Company, with \$25,000,000 capital.

NEWBURYPORT, MASS.—The Essex County Street Railway Company has been organized. Charles H. Odell, Salem, is the active spirit. The line will probably be completed before summer.

NORTHAMPTON, MASS.—The Western Hampshire Street Railway Company will be organized with \$200,000 capital to build twenty miles of electric road to Williamsburg, Goshen, Cummington and Worthington. Lyman D. James, Williamsburg; Alvan Burrows, Goshen; J. C. Hammond, Northampton; John Olmstead, Springfield are interested.

Michigan.

GRAND HAVEN, MICH.—Work on the electric road will begin this season.

DETROIT, MICH.—The Detroit Suburban Railway Company has applied for franchises for new electric lines.

SAGINAW, MICH.—The Saginaw & Bay City Rapid Transit Street Railway Company has secured its franchise.

SAGINAW, MICH.—A new bridge is to be built at Bristol street by the Saginaw Consolidated Street Railway Company.

LANSING, MICH.—Fire February 20, destroyed the barns of the Lansing City Railway Company together with five motor cars and all trailers. Loss, \$25,000.

OWOSSO, MICH.—Extension of two miles at the Owosso end are contemplated by the Owosso & Corunna Street Railway Company, as well as the conversion of the road to electricity.

PAW PAW, MICH.—An electric road to Lawton is to be built by Detroit capitalists, to whom a bonus of \$15,000 has been offered. J. W. Free, G. W. Longwell, C. R. Avery, C. W. Young and M. E. Whalen are interested.

DETROIT, MICH.—The Detroit & Mt. Clemens Electric Railway Company, which was formed a year ago, has been revived, and it is expected that work on the fifteen miles of track will begin at once. C. J. Reilly and C. M. Swift are interested.

Minnesota.

WINONA, MINN.—Application has been made for foreclosure of mortgages on the Winona General Electric Company and Winona City Railway Company.

Mississippi.

BILOXI, MISS.—E. G. Burklin has been given a franchise for an electric road, which must be completed this year.

PASS CHRISTIAN, MISS.—A franchise has been granted to C. Phelps, E. Sugden and F. Seal to build and operate a street railroad.

MERIDIAN, MISS.—The Meridian Electric Street Railway Company has been incorporated with \$100,000 capital, by J. D. Collins, W. W. Shelby and M. R. Grant.

BILOXI, MISS.—The Gulf Coast Electric Railway Company, capital \$500,000, will operate under the franchise granted A. M. Dahlgren. The officers are: A. M. Dahlgren, president; J. B. Cable, vice-president and manager; G. W. Bennett, second vice-president and auditor; J. V. Ross, secretary.

Missouri.

ST. LOUIS, MO.—The Jefferson Avenue Railroad Company has applied for an electric franchise.

ST. LOUIS, MO.—The St. Louis County Street Railway Company has increased its capital to \$50,000.

ST. LOUIS, MO.—The King's Highway Boulevard Syndicate has applied for a street railway franchise.

TRENTON, MO.—James and John Kelly are reported to have leased the North Side Electric Street Railway Company.

KANSAS CITY, MO.—Electricity will be used on the Westport and Independence lines of the Kansas City Cable Railway Company.

ST. LOUIS, MO.—The Southern Railway Company has been granted permission to construct its line. Girder rail, 78-pound, will be laid.

ST. LOUIS, MO.—The Magnolia Avenue Railroad Company has petitioned for a franchise. Farrar & Tate, real estate, can give information.

ST. LOUIS, MO.—The Mid-Suburban Electric Railway Company has been organized and will apply for a franchise. George B. Webster is attorney.

ST. LOUIS, MO.—It is reported that an offer has been made for the Clayton & Forest Park Electric Railway, and that the 1st of April will see it in operation.

ST. LOUIS, MO.—The Lindell Railway Company will receive a franchise for an extension through the southeast corner and along the south line of Forest Park to the city limits.

KANSAS CITY, MO.—The consolidation of the Grand Avenue and the Kansas City Cable Railway companies has been annulled by a decree of the supreme court, on application of the minority stockholders.

Nebraska.

OMAHA, NEB.—The location of the state fair grounds near Elmwood park will compel the extension of the Omaha Street Railway Company.

New Hampshire.

PLAISTOW, N. H.—W. H. Hillis, J. W. Sleeper and H. H. Cushing are reported to be interested in a proposed electric line to Haverhill.

MANCHESTER, N. H.—The Manchester Street Railway Company has floated \$250,000 in bonds. An electric road will be constructed this season.

New Jersey.

TRENTON, N. J.—The Trenton Passenger Railway (Consolidated) will extend its lines.

ASBURY PARK, N. J.—The Long Branch & Pleasure Bay Street Railroad Company has been bought by J. C. Shaffer, president of the Seashore Electric Company. Extensions will be built this season.

PATERSON, N. J.—The James A. Morrissey system of electric railways has been absorbed by the New Jersey Electric Railway Company, which has just filed a \$3,000,000 mortgage. The officers are Charles A. Johnson, president; Thomas D. Jordan, vice-president; James A. Morrissey, second vice-president and treasurer; John J. Scanlan, secretary.

New Mexico.

ALBUQUERQUE, N. M.—Jesse M. Wheelock is operating the Albuquerque Street Railroad as agent for O. E. Cromwell, trustee of the bondholders. Five thousand dollars will be spent this year on a park, orchestra, etc.

New York.

SYRACUSE, N. Y.—The Syracuse & East Side Railroad Company will make extensions.

NEWBURG, N. Y.—Work has begun on the Walden & Orange Lake Electric Railroad.

BOWMANVILLE, N. Y.—Citizens have raised \$2,000 bonus for an electric railway extension.

BUFFALO, N. Y.—The Buffalo & Williamsville Electric Railroad Company will extend its line to Clarence.

WATERTOWN, N. Y.—H. F. Iglehart is reported to have secured control of the Watertown Electric Street Railway.

COHOES, N. Y.—The Cohoes City Railway Company will begin construction work as soon as frost is out of the ground.

ALBANY, N. Y.—The Albany & Suburban Railroad Company will be incorporated to build an electric road to Castleton.

FRANKFORT, N. Y.—The Frankfort & Utica Street Railway Company has been incorporated to build seven miles of road.

ALBANY, N. Y.—It is reported that the Albany Railway Company is contemplating an extension thirty-two miles, to Schhoarie.

NEWBURG, N. Y.—The Newburg Electric Street Railway Company lost its car sheds and nine cars by fire. Loss, \$5,000; insured.

LONG ISLAND CITY, N. Y.—The Long Island City & Newtown Electric Railroad has been leased to the Steinway Railway Company.

CORNING, N. Y.—The mayor has signed the electric railway franchise. Work of construction will begin as soon as the weather is favorable.

NIAGARA FALLS, N. Y.—H. C. Symmes, J. A. Lowell, J. G. Cadham, will apply for a charter for an electric road from Niagara Falls South to this city.

NEW YORK, N. Y.—The Metropolitan Street Railroad Company has secured a permit for a \$250,000 car and power house on Lenox avenue, between 146th and 147th streets.

NEW YORK, N. Y.—Chauncey J. Parker, Newark, N. J., and Thad T. Groves, New York, have been appointed receivers of the Electrical Construction & Supply Company.

NORTH TONAWANDA, N. Y.—George P. Smith has applied for an electric road franchise. Hon. W. Caryl Ely, Niagara Falls, also asked for a franchise for an electric road.

BUFFALO, N. Y.—The Buffalo, North Main Street & Tonawanda Electric Railroad has passed into the hands of the General Electric Company on foreclosure of a mortgage.

PATERSON, N. J.—John J. Scanlon, secretary of the New Jersey Electric Railway Company, is in the market for sixty open cars, half to be equipped with 40-horse power motors.

WATERTOWN, N. Y.—The Dexter & Brownville Street Railway Company has been incorporated with \$40,000 capital, to build four miles of road, connecting with the Watertown electric road.

WHITE PLAINS, N. Y.—The New York, Elmsford & White Plains Railroad has been granted a franchise, which provides that \$2,500 must be forfeited if the road is not completed by August 1.

LITTLE FALLS, N. Y.—The Little Falls & Herkimer Railroad Company has been incorporated with \$80,000 capital, by Clinton Beckwith and John D. Henderson, Herkimer; J. V. Quackenbush, Mohawk.

NEW BRIGHTON, S. I.—Franchises have been granted to the Staten Island Electric Railroad Company, Midland Company and the Staten Island Interior Electric Railroad Company. Electric construction on all lines will be begun this season.

BALLSTON SPA, N. Y.—The Ballston Electric Railroad Company has been incorporated with \$200,000 capital, by Thomas Craig, Trenton; Charles E. W. Smith, New York; Frederick R. Barnes, Ballston Spa, and others. Mr. Barnes is superintendent, and is ready to let contracts.

BATAVIA, N. Y.—The Batavia Street Railway Company has been incorporated with \$75,000 capital, to build 7½ miles of electric road, by Amos H. Stevens, A. B. Wilgus, C. C. Marsh, New York; H. R. Burdick, Malden, Mass.; Mark Sugarman, Brooklyn; F. J. Fadner, Chicago.

HERKIMER, N. Y.—The Bleecker Street & Utica Park Railway Company has been incorporated with \$70,000 capital by John V. Quackenbush, Mohawk; Clinton Beckwith, Glen P. Munson, H. P. Witherstine,

Charles G. Grosvenor, Robert Earl, second, Herkimer; Nelson J. Davis, Utica; John Loftis, Matthew F. Farrell, Wallace W. Crosby, Frankfort.

NEW ROCHELLE, N. Y.—The New York, Westchester & Connecticut Traction Company has been incorporated with \$500,000 capital to build sixteen miles of electric road, by Martin J. Keogh, New Rochelle; Bernard Kates, Paterson, N. J.; John Foley, Jr., Sewaren, N. J.; John F. Couch, John A. Bense, New York. It is supposed to be a branch of the People's Traction Company, New York.

FLUSHING, L. I.—The sale of the Flushing & College Point Street Railway Company, April 4th, has been ordered by the court. A new company has been organized, consisting of Daniel Odell, E. Bayard Hall, Paul D. Cravath, John W. Houston, V. K. McElhenney, Frank A. Dillingham, Philip F. Kobbe, Harvey Romer, and Charles Snow Kellogg, New York, will probably bid in the property.

Ohio.

HUBBARD, O.—An electric railway to Youngstown is being agitated.

COLUMBUS, O.—The Crosstown Street Railway Company will extend its line.

ELYRIA, O.—A bonus of \$35,000 has been raised for the electric line to Oberlin.

ELYRIA, O.—L. M. Coe, Cleveland, has been granted a franchise for an electric road.

LORAIN, O.—The Lorain & Wellington Electric Railroad has surveyors in the field.

CINCINNATI, O.—The Cincinnati Street Railway Company will build an extension on Main street.

LIMA, O.—An extension to a summer resort is being considered by the Lima Street Railway Company.

CINCINNATI, O.—The Mt. Auburn Cable Railway was sold to David Sinton for \$150,000, representing the bond-holders.

LIMA, O.—The Lima Electric Railway Company will build a new power house and car stable, and may put in a lighting plant.

NORWALK, O.—S. E. Crawford is organizing a company to build ten miles of road to Fairfield. It is contemplated using steam motors.

COLUMBUS, O.—The Indianola Land Syndicate has turned over to the Columbus Street Railway Company the Fourth Street Railway line.

YOUNGSTOWN, O.—Canfield township will vote in April on the proposition to issue, \$20,000 bonds to build an electric railway to Youngstown.

BUCYRUS, O.—The Bucyrus & Galion Suburban Electric Company has been granted a franchise for an electric railway between the two towns.

CLEVELAND, O.—The Akron, Bedford & Cleveland Railroad Company, 616 Garfield building, wants two light locomotives for use in construction work.

CINCINNATI, O.—The villages of Fern Bank, Addyston, Home City and Delhi are considering a proposition for the extension of the Cincinnati Street Railway.

COLUMBUS, O.—The franchise of the Buckeye Park Street Railway Company has been extended to June 1, and work will be begun as soon as the weather will permit.

BIRMINGHAM, O.—Fifty-six residents along the proposed line have incorporated the Milan, Birmingham & Elyria Electric Railway Company with \$100,000 capital.

YOUNGSTOWN, O.—New York capitalists have become interested in the Youngstown, Park & Falls Electric Railway Company, and will extend it five miles this season.

LIMA, O.—An electric interurban 100 miles long is projected to Bellefontaine, by Chicago capitalists, over the old right of way of the Columbus, Lima & Milwaukee Railroad.

CLEVELAND, O.—The Cleveland & Elyria Electric Railroad Company has placed contracts at its office, 235 Society for Savings building, for 1,500 tons steel T rail, 85 tons copper wire, 6 double truck motor cars, 6 double 30-horse-power motor equipments, 4 150-k. w. generators, 800-horse-power in engines and boilers.

CLEVELAND, O.—W. H. Lawrence, W. C. Hayes and F. Wayland Brown, officers of the National Carbon Works Company, are interested in the proposed Cleveland & Lorain Electric Street Railway, which will soon be incorporated. J. M. Gasser, B. F. Phinney, H. R. Coffinberry and Reuben Hall are interested in another proposed line.

WARREN, O.—The county commissioners have approved the assignment by Anderson & McVey to the Mahoning Valley Electric Street Railroad Company of the franchise of the line to Niles. The officers of the company are C. F. Clapp, president; R. G. Sykes, vice-president; John E. McVey, secretary; A. A. Anderson, treasurer.

TIFFIN, O.—Judge Schaufelberger, in the common pleas court, has ordered the sale of the Tiffin & Interurban Consolidated Electric Railway; and that the Tiffin Electric, the Tiffin Street Railway (horse) and the incomplete Tiffin & Fostoria roads be sold separately. The prospective buyers of the Tiffin & Fostoria line will push it to completion.

AKRON, O.—The Akron, Bedford & Cleveland Railroad Company will let following contracts at its Cleveland office, 616 Garfield building: 2,200 tons 60-pound T rail, 150 tons copper wire, 10 double truck motor cars, 10 double 50-horse-power motor equipments, 4 250-k. w. generators, 1,200-horse-power in engines and boilers. J. F. Randall, M. E. Cleveland, will superintend construction of power house.

Pennsylvania.

READING, PA.—The city council has granted franchises to the Birdsboro Street Railway Company.

CARLISLE, PA.—Application for receiver for the Cumberland Valley Traction Company has been made.

PITTSBURG, PA.—The Pittsburg, Allegheny & Manchester Traction Company will build an extension.

ROCHESTER, PA.—The People's Electric Street Railway Company will extend its line from Freedom two miles.

NEW CUMBERLAND, PA.—The Harrisburg & Cumberland Street Railway Company has secured right of way.

CHARLEROI, PA.—The Charleroi, California & West Brownsville Electric Railway Company will build as far as Roscoe this season.

PITTSBURG, PA.—The Scoville Island Street Railroad has been incorporated with \$30,000 capital by William L. Thompson and others.

SHARON, PA.—J. H. White, Daniel Stone and J. F. Barker, Beaver Falls, bought, at sheriff's sale, the Shenango Valley Street Railway Company.

READING, PA.—Dr. J. S. Trexler, Kutztown, is president of a company incorporated with \$100,000 capital to build an electric line to Allentown.

PHILADELPHIA, PA.—The People's Traction Company has awarded the contract for a power house building at Ogontz and a car house at Willow Grove.

SHAMOKIN, PA.—The Shamokin & Mt. Carmel Electric Railway Company will extend its line to Unionville. Additional machinery is being installed.

WEST CHESTER, PA.—The West Chester & Downingtown Street Railway Company has been incorporated, with \$100,000 capital. James McGraw, West Chester, is president.

PITTSBURG, PA.—The Pittsburg & Mansfield Electric Railway will begin construction, as the U. S. senate has granted the right to build a bridge across the Monongahela river. E. H. Holbrook is president.

DARBY, PA.—The Chester & Delaware County Electric Railway Company is making surveys in Haverford township to Lancaster. The John Ashhurst estate, or Todd, Murphys & Co. can give information.

WASHINGTON, PA.—The Washington & Tylerdale Street Railway Company has been incorporated with \$10,000 capital by A. E. Townsend and J. J. Miller, Pittsburg. The company owns the franchises of the old Washington Electric Street Railway Company.

PITTSBURG, PA.—The Rapid Transit Bridge Company has been incorporated with \$20,000 capital by William C. Jutte, James W. Tree, August Jutte, Pittsburg; Samuel P. White, president of Penn Bridge Company, New Brighton, and Joseph F. Mitchell, New Brighton.

South Carolina.

COLUMBIA, S. C.—The Columbia Electric Street Railway Company will extend its lines, making a belt around the city.

South Dakota.

YANKTON, S. D.—Commodore Kountz, Pittsburg, has made a proposition to the city to construct and operate an electric street railway.

Tennessee.

KNOXVILLE, TENN.—The Middlebrook Electric Railway Company will extend its line.

NASHVILLE, TENN.—The Belmont Street Railway Company has been incorporated by James C. Bradford, A. H. Robinson, Edgar Jones, Isaac T. Rhea, R. W. Turner.

Texas.

GALVESTON, TEX.—The Galveston Street Railway Company has received a lighting franchise.

SAN ANTONIO, TEX.—S. P. Maury bought the cross town street railway for \$2,000, at receiver's sale.

GALVESTON, TEX.—The Galveston City Railroad Company will equip the five miles of its line operated by mule power with electricity.

SAN ANTONIO, TEX.—The San Antonio Rapid Transit Street Railway Company has been sued for \$100,000 by Franklin Trust Company, trustee, Brooklyn.

Vermont.

WINOOSKI, VT.—The Winooski & Ft. Ethan Allen Electric Company will construct its line this season.

BRATTLEBORO, VT.—The railroad commission has been petitioned for right of way for an electric road to West Brattleboro and Hinsdale, N. H.

Virginia.

NORFOLK, VA.—It is reported that Pottsville, Pa., parties have bought the Ocean View Railroad and will equip with electricity and make extensions.

RICHMOND, VA.—W. F. Jenkins is interested in a project for a conduit electric railway system, and Julian Bryant is projecting an overhead system. If either succeeds, a bridge will be required.

Washington.

TACOMA, WASH.—Frank C. Ross and other have applied for a street railway franchise to Seattle.

TACOMA, WASH.—The Tacoma Traction Company will equip its line with electricity and buy cars, etc.

TACOMA, WASH.—C. B. Hurley, A. K. Hiscock, W. V. Burrell and George W. Delamater have applied for a street railway franchise.

SEATTLE, WASH.—Frederick Bausman has been appointed receiver of the Ranier Power & Railway Company, succeeding M. F. Backus, resigned.

SEATTLE, WASH.—The Ranier Power & Railway Company has been bought at master's sale by Angus Mackintosh, A. M. Brookes and Frederick Bausman.

SEATTLE, WASH.—The Third Street & Suburban Railway Company has been incorporated with \$100,000 capital, by A. McIntosh, A. M. Brookes and Frederick Bausman.

TACOMA, WASH.—The New York Guaranty & Indemnity Company, as trustee, has sued the Tacoma Railway & Motor Company, to secure payment of \$1,500,000 first mortgage bonds.

West Virginia.

FAIRMONT, W. VA.—An electric road fifteen miles in length and costing \$100,000 will be built from Fairmont to Riversville, via West Fairmont, Monongah and Barnesville.

CHARLESTON, W. VA.—The West Charleston Street Railway Company has been incorporated to build to Kanawha, two miles, and to Wilson's Hollow, three miles, by George S. Couch, banker; J. W. Rakke, Peter Selman, Malcolm Jackson, George S. Laidley and F. P. Grosscup, president of the Buckeye Cart Company.

Wisconsin.

WAUKESHA, WIS.—The Waukesha Beach Electric Railway Company will build a ninety foot bridge.

SHEBOYGAN, WIS.—The Sheboygan City Railway Company has petitioned to equip with electricity.

APPLETON, WIS.—The Appleton Edison Electric Railway Company will extend its railway to the fair grounds.

LACROSSE, WIS.—The LaCrosse City Railway Company has applied for extensions and will probably buy cars.

WEST SUPERIOR, WIS.—The Superior Rapid Transit Railway Company will probably extend its line to Itasca.

GREEN BAY, WIS.—A five mile extension to the beach summer resort is contemplated by the Fox River Electric Railway Company.

GREEN BAY, WIS.—Mayor James H. Elmore has announced that, with Frank Derzer, he has practically arranged to secure interurban electric road franchises in Neenah, Menasha, Appleton and Kaukauna.

The report of William Barclay Parsons, chief engineer of the New York board of rapid transit commissioners, is a very complete treatise on the underground and elevated roads of London, Glasgow, Liverpool, Berlin, Paris, Baltimore and Chicago. The descriptions of these systems is followed by a comparison of results. It is interesting to note that end doors give better results as to short stopping time at stations than do side doors. The average rate of fare abroad is lower than the American standard five cents, and after reviewing the condition of things abroad the author says, "It is evident therefore that fares can be reduced to a point where there is little profit to the company and little profit to the traveler." As to the economy of electricity, figures are given from the actual performance of electric plants which speak for themselves. The report is the most complete of its kind ever published, and is a credit to Mr. Parsons, its author.

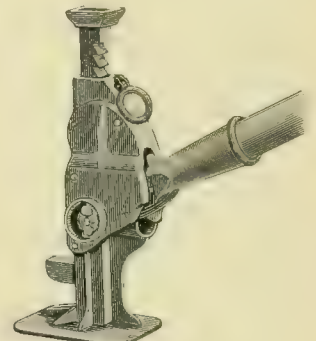
An Italian track laborer was recently hired as conductor by the Bridgeport, Conn., Traction Company, and now all the other section hands aspire to be conductors.

THE BARRET LIFTING JACKS.

The Duff Manufacturing Company of Allegheny, Pa., manufactures a very complete line of quick action car jacks, two of which are specially adapted to the street railway business and are illustrated here. No. 2 is for carrying on the car for use in emergencies. It is light, strong, and convenient to handle, taking up little space in a car and is of course very handy to have in case of accident. The weight is moved by both up and down strokes of the lever. The direction of motion up or down is controlled by the thumb screw at the side of the



NO. 19.



NO. 2.

frame. The capacity of this jack is 10 tons, weight 60 pounds, height of frame 20½ inches, rise of bar 10 inches. Number 19 is for use around car barns. It is more portable than hydraulic jacks and less liable to derangement. It has a forged steel rack for reaching under car bodies. Both jacks have side lugs for lifting low loads. The latter lifts and lowers on the down stroke of the lever only. It is 28 inches high when the rack is down and can be raised, 17½ inches. Its weight is 90 pounds.

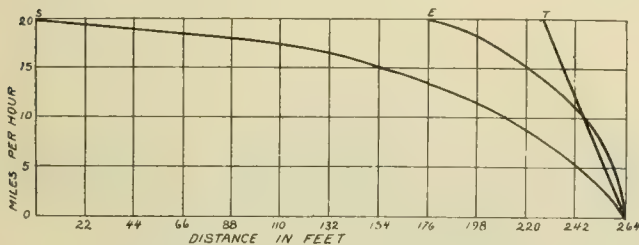
COUNTERFEIT MONEY PASSED ON CONDUCTORS.

A dapper man visited Omaha, Neb., recently, rode on the electric cars evenings, and paid his fare with \$5 bills. They were counterfeit. He would board the rear platform, tender a good bill, and, on being asked if that was the smallest he had, would take it back, fumble in his pocket, and reply that it was, handing to the conductor the same bill, apparently, but really another, a counterfeit, the sleight-of-hand being unobserved on the dimly-lighted platform.

Visitors to the state convention of the Epworth League at Newport, Ky., by special arrangement, were enabled to ride through two states, three counties, three cities, across two suspension bridges and two rivers, all for five cents, over the lines of the South Covington & Cincinnati Street Railroad Company.

THE COMMERCIAL ADVANTAGE OF QUICK STOPS.

The advantage of an improved brake is usually considered simply from the emergency aspect. The part that quick service stops play in the daily schedule and daily earnings of a car is nearly as important as the emergency consideration. This has been clearly demonstrated where improved brakes have been put in every day operation. In this connection it is proper to investigate the matter of emergency stops as made in air brake tests conducted on steam roads. These will hold good for street railroads as long as the rails are dry. In the accompanying diagram the line beginning at E is a typical speed curve of a steam train making an emergency stop. This curve is an approximate average of a number of curves taken from the report of P. H. Dudley



who carried on the famous air brake tests on the New York Central at Karner, N. Y., in September 1892. The pressure on the brake shoes was 70 per cent of the weight of the train. This is the standard pressure adopted by the Master Car Builders' Association. The distance required to stop from a speed of twenty miles an hour is 88 feet as shown by the line beginning at E in the diagram. Three-fourths of this distance is required to reduce the speed from 20 to 10 miles an hour. If the pressure could be varied on the brake shoes so that the retarding power would be the same from 20 to 10 miles an hour as it is from ten miles an hour to zero, a stop could be made in 35 feet as represented by the line T. This of course is a somewhat theoretical condition, but there are some brakes on the market to-day with which it is possible for the motorman to carry out this principle in a crude way, if he is properly educated, by applying the brakes hardest at first and gradually reducing the pressure as the car slows down. For this comparison then we will assume that on a dry track a stop can be made in 88 feet from a speed of 20 miles an hour without undue shock. The line beginning as S in the diagram may be assumed to represent a slow service stop. By a calculation of the average speed during the stops E and S, it is found that the speed during the 264 feet required to make the stop S, averages 14 miles an hour. When the stop E is made, the speed for the 264 feet preceding the point where the car is stopped is 17 miles an hour. This means that it takes 1.8 seconds more out of the schedule time to make the slow stop than it does the short one. Perhaps this seems like a very little saving, but a car running 150 miles a day and stopping 5 times to a mile stops 750 times a day.

At 1.8 second saving per stop, 22 minutes are saved on a day's run and the car's earning capacity is increased by that much. There is also in practice another consideration which helps cars with quick action brakes to make better time. In actual city running it is many times not possible for a car to attain its maximum speed because of the short distance between stops. The quicker a car can be stopped, the longer it can be allowed to accelerate speed before applying the brakes. This makes a still greater saving in time than figured at first in favor of the quick stop.

When the track is slippery the comparison holds good although the time in which a car can be stopped is lengthened in all the cases considered. It is a significant fact that when improved brakes are put on the same line with the ordinary ones, among the first comments of the motorman is in regard to the ease with which he can maintain schedule time.

NO SEAT NO FARE LEGISLATION.

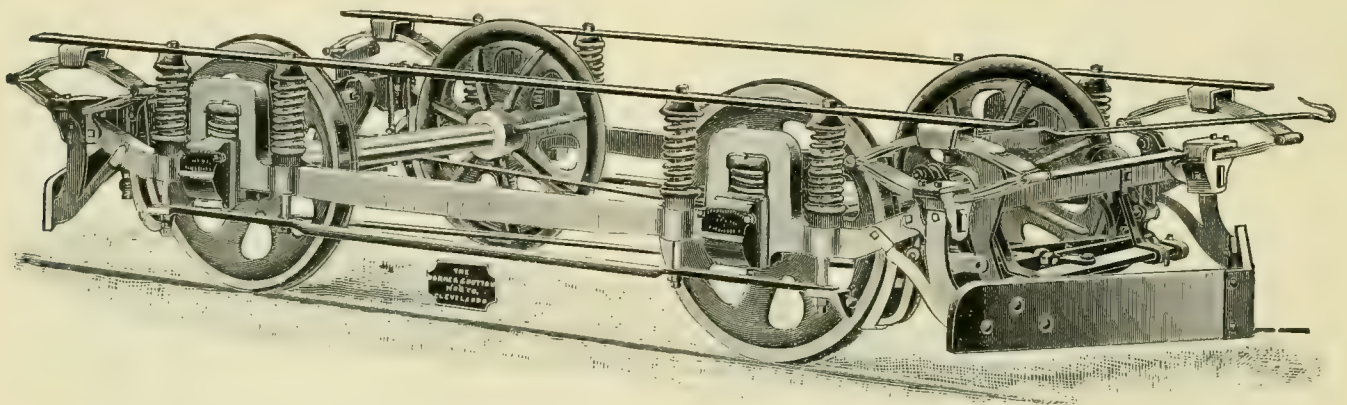
John Smith is a conductor on a line in a large city. He has been employed several years, in all kinds of seasons and at all times of the day, being ranked as a first-class man. But John Smith has a complaint to make. He has heard that the state legislature is considering a bill which will cause him a lot of trouble if it is passed, for it fixes the rate of fare for a passenger who obtains a seat, and a less rate of fare for one who has to stand. What is troubling Smith is how he can run his car according to law, and escape going to an insane asylum.

"It's just this way," says Smith. "Anybody can collect fares if they are all the same, but how can it be done if standers are half fares? Do the standers have to stand all the time, or can they have a choice of sitting or standing when there is a vacant seat? Then, do I collect the difference between standing and sitting fare, or do I collect full sitting fare, or nothing? Suppose a lady comes into a crowded car, a gentleman offers her a seat, which she accepts, do I collect sitting fare or standing fare, and do I refund the money to the sitter who is standing? How am I going to keep my report straight under this system? That's what I'd like to know. Everybody crowds into the first car, anyway, while the next is sure to have vacant seats. What the legislature ought to do is to pass a law making persons pay double fare who enter a car having all seats taken. I'd like to see that kind of a law in force. It would make it lots easier for us conductors. This conductor business is getting altogether too complicated for me. I guess I'll have to hunt a job on a steam road. I'm glad I don't have to drive a car with a fare box attachment. When the new law goes into effect the driver will have a mighty hard time of it."

Six hundred feet of heavy copper return wire was recently stolen from between the tracks of the Point Defiance, Tacoma & Edison Railway, at Tacoma, Wash. It is a good thing the tracks are fastened.

DORNER & DUTTON FORGED MOTOR TRUCK.

The Cleveland Electric Railway Company has adopted as standard the latest type of solid forged motor truck brought out by the Dorner & Dutton Manufacturing Company, Cleveland, shown herewith. This truck, like all the trucks made during the past seven years by this company, is made with solid forged side frames, avoiding the numerous bolts and rivets so common to other forms of trucks, the Dorner & Dutton Company being the original makers of this style of truck. This truck called their No. 25-A spring suspended, has double coil springs over each journal box, the inside coils being intended to carry the car body light, and the outside coils to take up the heavy loads, thus rendering the springs perfectly flexible under all conditions. By this arrangement of springs every pound of weight of the car body, motors,



DORNER & DUTTON MANUFACTURING COMPANY'S SOLID FORGED MOTOR TRUCK.

and truck, excepting only the wheels and axles is suspended on springs, thus reducing to a minimum the "sledge hammer" blows to the rail joints. The brakes used on all trucks made by this company are of the latest approved standard. Brake bars are of the truss type, giving great strength combined with lightness. Ends of bars are round and fit into malleable iron brake heads, making them practically automatically adjustable and fitting to all four wheels alike.

The brake soles are made of combined wrought and cast iron. Levers are compound, vertical, and horizontal, giving the greatest amount of power with least amount of friction.

The standing for high grade products which the Dorner & Dutton Company has fairly earned and so long enjoyed is well and favorably known to the trade as are the gentlemen themselves.

Suit for \$10,000 damages for breach of promise has been brought by a woman against a Chicago street car conductor. As she alleges in her declaration that she was compelled to furnish him the money for his deposit, when he got his job, it looks as if she was out the cost of beginning suit and attorney's fees, and that her wounded heart will not be healed by the remedy she seeks.

SPEED REGULATING OBJECT LESSON.

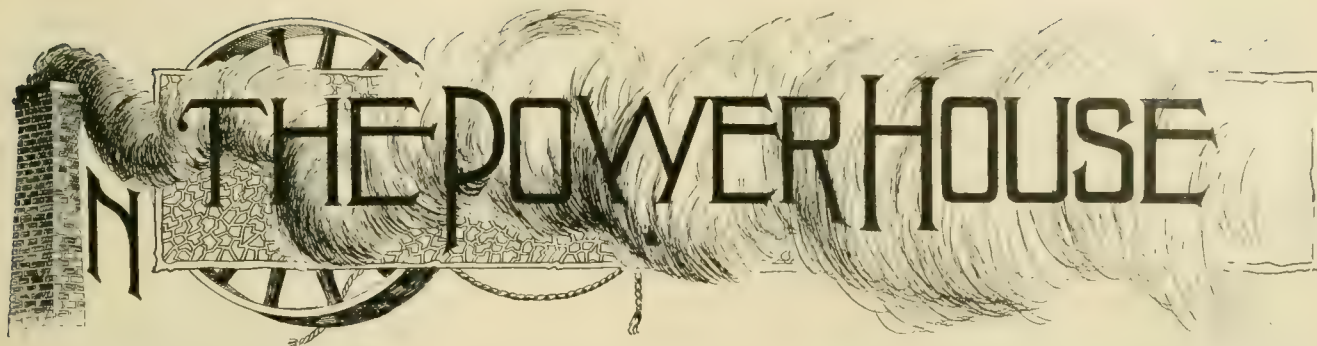
When an alderman or a town trustee realizes that his term of office is about to expire, and the chances are slim that he will be returned by his constituents, he studies up some scheme of sand-bagging the street railway companies, or other semi-public corporation. By this means he hopes to cover up his misdeeds by posing as a reformer. A favorite resource by which he expects to ride again to the halls of state, is an ordinance to regulate the speed of trolley cars. Ten miles an hour seems as fast as a mile a minute to one who doesn't know anything about it, yet it is mighty slow to one who has had experience.

Such an ordinance is pending in New Haven, and President David Corey and Secretary George A. W. Dodge, of the New Haven Street Railway Company, invited the mayor and city fathers to take a trip over the

line. The invitation was accepted, and the car put through its paces from slow to fast, over a mile of track that had been carefully measured; time being accurately kept. It was also shown how easily and quickly a car can be stopped when going at great speed.

In Omaha, if we remember correctly, an ordinance was introduced just about election time by an aspirant for re-election, who thought three miles an hour was fast enough for street cars to run. Next morning all the cars were running at the rate of three miles an hour. General Manager Smith had been interviewed the night before, and said the company was willing to adopt the new rate of speed without an ordinance, and ordered notices in all the cars ordering the discharge of all conductors disobeying the rule. The public was furious, and steps were taken to compel the company to resume the old rate of speed. The ordinance was never heard from again.

"Cowboyed" is a new word coined by a German merchant of Racine, Wis. Street car traffic was stopped by the snow blockade, and the business man indignantly declared: "It was a big shame de vay pisness vas run, and dem street car fellers ought to be cowboyed, den dey would learn someting."



This department is devoted to the construction and operation of electric railway power houses. Correspondence from practical men is specially invited. Both the users and makers of power house appliances, are expected to give their views and experiences on subjects within the range of the department.

Recording wattmeters are beginning to find a place on the switchboards of the most recently constructed railway stations and ought to prove very valuable in keeping records of the output. It would be interesting to know how the day's output as measured by the wattmeter would compare with the average of readings taken at regular intervals from ammeter and voltmeter.

* * *

It is a rather peculiar feature of electric railway station building in this country that the type of boiler known as the Manning vertical fire tube is extensively used in the east while in the west it is practically never found. Western stations almost without exception use either water tube boilers or horizontal return flue boilers. It is hard to assign any good reason for this sectional prejudice. Perhaps the existence of water which scales badly throughout the west may have a little to do with it. The price of real estate might have a slight influence also.

* * *

The Berlin Boiler Inspection Society has come across a serious case of the danger of grease brought into boilers by the feed water. The water from a surface condensing engine was filtered (through a poor filter) into a feed water tank. One day one of the flues in a boiler fed from this tank collapsed and an investigation disclosed the fact that the inside was covered with a fatty brown slime. The theory is that when a boiler is coated in this way that the coating acts as a non-conductor thus allowing the plates to become overheated.

* * *

A defective casting in the safety valve of one of the boilers of the Toledo Consolidated Street Railway, at Toledo, Ohio, last month, caused a short shut down and some creditably quick work on the part of the employees. The safety valve broke, causing an enormous escape of steam, so that it was impossible to get at the hand valve in the steam pipe between the disabled boiler and the main steam line until the steam had gone down in the entire battery of boilers. To let the steam down, cut out

the boiler, fire up again, and have the cars moving, took just forty minutes. The accident was unavoidable and was the fault of no one around the station. The main point of interest is the short time it took to get the cars moving after it occurred.

* * *

The most promising field at present in which to look for the more economical generation of electric power seems that of the gas engine. For many years gas engines have been built in such small sizes that they are regarded by those unacquainted with the progress made, as nothing more than playthings for the operation of light machinery. The gas engine industry has, however, been recently taking on a very different aspect, especially in Europe. Gas engines of several hundred horsepower are being regularly built in England, and a company in this country has recently announced its intention to manufacture large gas engines of one to one thousand horsepower. The production of gas has also been cheapened. As to the economy of the gas engine over the steam engine there is no longer any doubt. The consumption of coal per brake horsepower hour of gas engines of less than 100 horsepower, is only one-half that of the most perfect, large, triple-expansion steam plants. Steam plants have the advantage of having had years of study expended on them. The gas engine industry is only in its infancy, so that there is much room yet for more economy, to say nothing of the fact that the economy of an engine increases with its size. There is then certainly a very promising outlook in this direction. If such economy is offered now, there is certainly a prospect that in future there will be a still greater improvement, and that in a few years the gas engine will be built to compete with the steam engine for all classes of work. On account of its extremely trying character, it is but natural to expect that street railway work will be one of the last fields to be invaded by the gas engine. The great incentives to gas engine makers to build engines for this class of work, because of the enormous amount of power used by electric railways, ought, however, to produce some results before long. An electric light plant of 300 horse power is being run by gas engines at Danbury, Mass. We understand that the Mt. Lowe electric railway was run for a time by oil engines. The adoption of gas engines would make a decided revolution in our power house practice, but if it proves to be economy it will, of course, take place.

The switchboard employed at Merrill, Wis., to control the storage battery which is used in connection with the railway and lighting plants there is shown herewith. It is arranged so that the battery cells can be thrown 240 in series between the trolley feeder and ground to steady the railway load, or 120 in series and two in parallel to help out the three-wire system of electric lighting. The battery has proved its value as a reservoir for the storage of power and a voltage regulator. When heavy loads

switches are thrown to connect to the railway leads, as shown by the diagram. Not only has the battery been successful in reducing the enormous variation in voltage which before was common, but it has enabled the company to get very much more commercially available power from its water wheels. The battery stores energy from the water wheels during the hours of light load. Thus more cars can be run on the railway, and a steam plant used for incandescent lighting can be shut down. It has been found that so perfect is the action of the battery as a voltage regulator, that railway and light generators can be run from water wheels coupled together without undue variation in the voltage.

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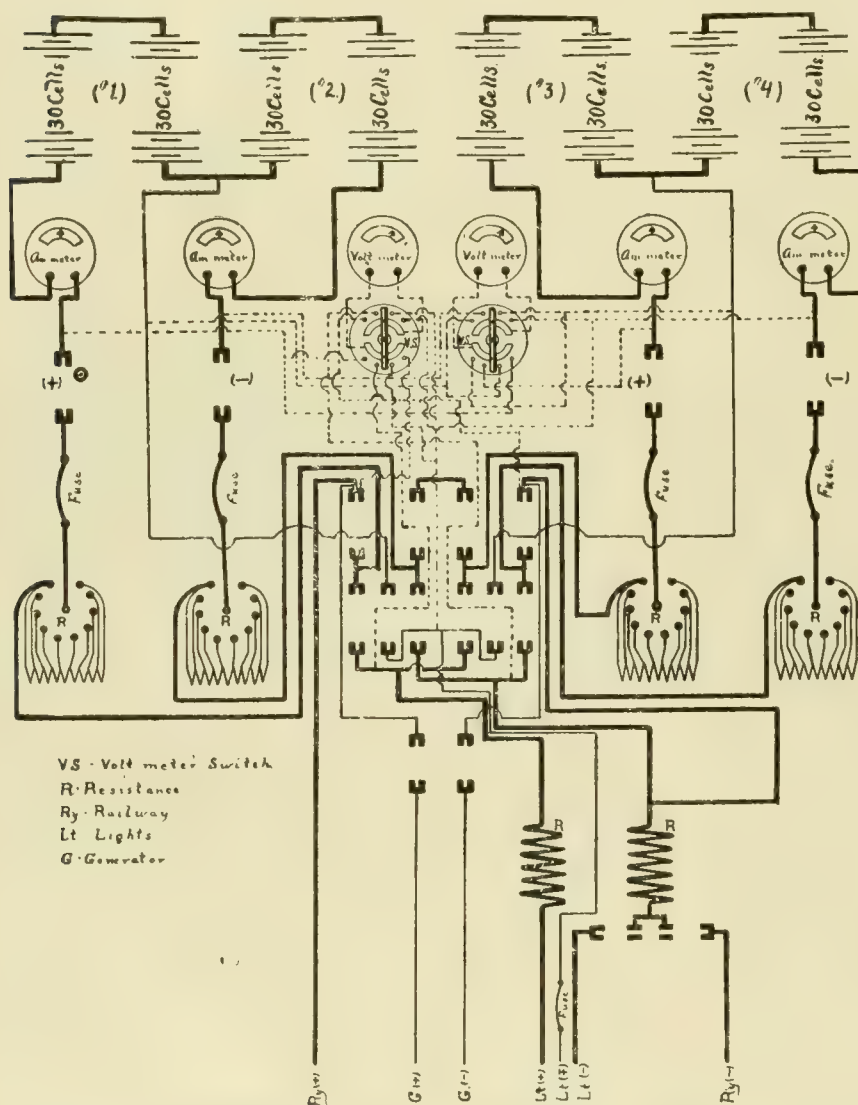
Car Barn Lighting.

BY I. B. WALKER, SUPERINTENDENT SIOUX CITY TRACTION COMPANY.

In the February number of the REVIEW, under the heading "In the Power House," I notice an article about how to light the car barns and car stations after running hours. I note the plans there suggested, and herewith offer you our plan for lighting car barns and car stations after running hours. I wish to say that we find it very satisfactory, and I have no doubt that the conditions in many power houses would favor this plan. Near our power house are the city lighting wires, carrying 1,000 volts alternating current. I have made a special converter, and reduced from 1,000 to 500 volts, and placed it in a convenient place in the power house. I arranged the circuit so that by a simple movement of a throw-over switch, the same lights burn from our 500-volt constant current or from the 500-volt alternating current reduced by the converter. This is a very simple arrangement, and the electrician at any station can at once work out this plan to suit his conditions from the above suggestion. You see it does not necessitate

double wiring at all. The same lights and wires do for both circuits, and all there is extra is this throw-over switch and converter. I wish to say again that this plan gives good service and is perfectly satisfactory in every respect, and I can safely recommend the plan to any one desiring electric light after running hours in car barn and station.

The Campania de Tranvais de Merida, Merida, Yucatan, is extending its lines. The change to electric traction is being contemplated. Thebaud Brothers, 87 Broad street, New York, are purchasing agents.



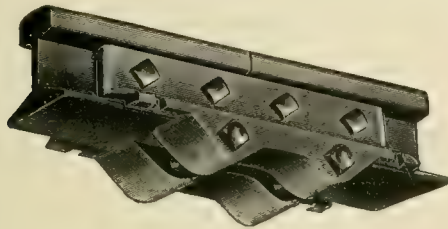
SWITCHBOARD FOR STORAGE BATTERY.—MERRILL, WIS.

come on, the generator voltage drops, and the battery voltage overcoming that of the generators, the battery discharges into the line to help the generators carry the load. When light load comes again, the generator voltage rises, and the batteries are charged. The relative proportion of battery charge and discharge is regulated by resistance coils. This causes some waste of energy, but as water power is used this is not important. The switchboard has two double throw 3-pole switches, one double throw single pole, and four single pole switches. The single pole switches are open when the battery is connected to the railway circuit, and the two 3-pole

A RAIL JOINT OF GREAT STRENGTH.

One of the most substantial of the numerous mechanical joints brought before the street railway public is the Stever rail joint, which is illustrated herewith. The designer of the Stever joint has not been sparing of metal. Both the web and the base of the rail are almost entirely enclosed, leaving only the head exposed.

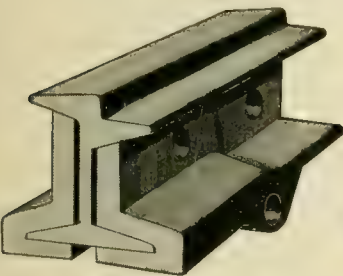
Simplicity is one advantage of the joint, each joint con-



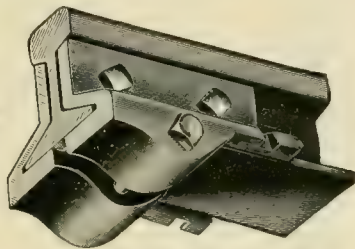
JOINT ON T RAIL.

sisting of only two parts, and these are both alike, for T rail. For girder rail the outside half of the joint is necessarily higher than the inside half. Downward strains on the rail are said to be conveyed directly to the joint ties. Upward strains are provided for by the rigid jaw clamp.

The striking feature of the Stever joint is the manner in which it takes hold of the base of the rail. As the



JOINT ON GIRDER RAIL.



JOINT AT END OF RAIL.

two parts are drawn together by the bolts, each half of the rail base enters its half of the joint like a wedge, giving a remarkably tight fit. The strain, when the base of the rail tends to move up or down, is thrown not upon the bolts, but upon the jaw clamp, which is the strongest part. Any design of girder or T rail can be fitted with this joint.

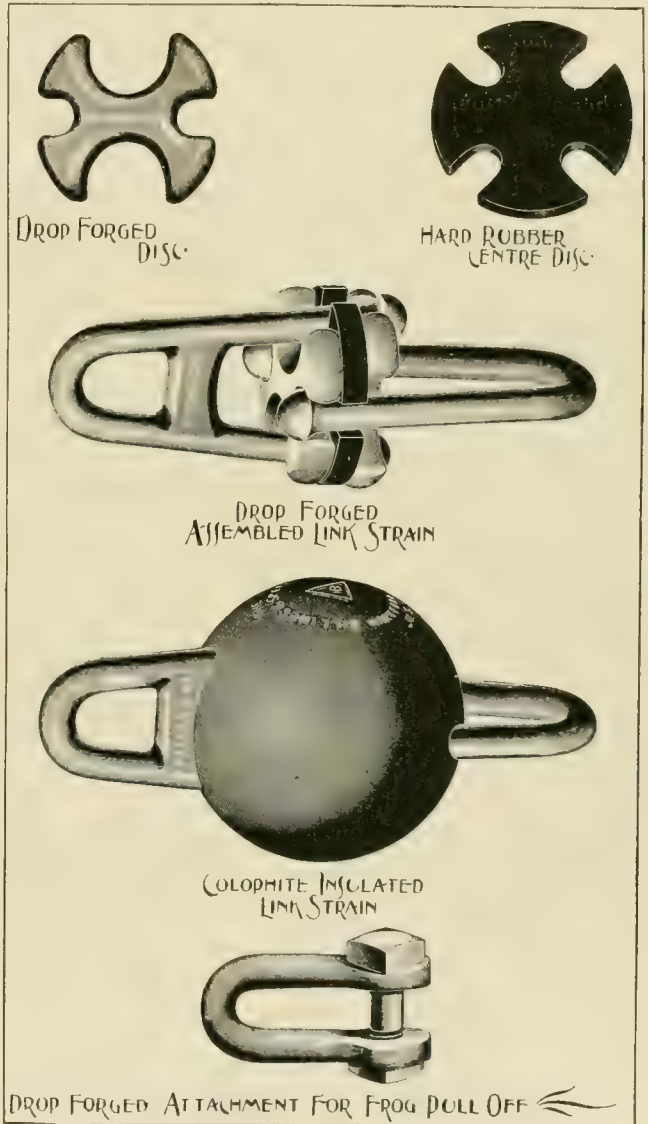
W. Worth Bean, president of the St. Joe-Benton Harbor Electric Street Railway Company, called on his way home from the meeting of the executive committee American Street Railway Association, at Montreal.

W. C. Gotshall has assumed the position of chief engineer of the Union Depot Railroad of St. Louis, and will have charge of electrical and mechanical departments. It will be remembered that he recently installed the three-wire system on a part of that road.

G. W. Baumhoff, superintendent of the Lindell Railway, of St. Louis, recently represented the roads of that city in opposing the bill now before the Missouri legislature, to reduce street railway fares to 2½ cents during the rush hours.

DROP FORGED TROLLEY EQUIPMENT.

When Charles E. Billings organized the Billings & Spencer Company, of Hartford, Conn., in 1869, after having been connected with the Colt's Patent Fire Arms Company for six years, and afterwards at the gun factories of E. Remington & Sons, the process and methods of mechanical drop forging were crude, the work imperfect and the limits of practical application narrow. For a long time the latent possibilities in the system waited



for the right man to develop them. It remained for Mr. Billings, organizer and president of this company, to perfect the art of mechanical forging, which has been done on scientific principles by means of his inventive talent. A single instance will illustrate:—While visiting the Edison Machine Works, in New York City, in 1886, he noticed the method employed in making commutator bars. The segments were made in two pieces, united by rivets and solder. In conversation with the general manager of the works, the latter expressed the opinion that it was not possible to produce a commutator bar of one

piece of wrought copper and give it the required shape. Mr. Billings, upon his return to Hartford, made a series of experiments and in two months sent to the Edison Company an invoice of drop forged pure Lake copper commutator bars each one made of a single piece of wrought copper, having a homogeneous molecular structure throughout, of the greatest possible density with an increased efficiency. The Billings' patent drop forged commutator bars are now in general use on the street railways and are used almost exclusively by the largest electric manufacturing companies in the United States.

The accompanying illustrations will give a clear idea of the Billings & Spencer Company's new drop forged link strain, which has interchangeable attachments making either a frog pull-off or an adjustable pole strain, made either of Tobin bronze or steel, the latter nickle plated or galvanized. The link strain is insulated with a center disc of hard rubber. The ball is insulated with colophite.

The colophite insulation is the invention of S. J. Hoggson of the Colophite Manufacturing Company, New Haven, Conn., who was the first inventor and manufacturer in the United States of the substitute for ivory, now known as celluloid. In 1861 he commenced the manufacture of that compound and continued until 1866. In 1871 the first celluloid company was formed and since then it has grown to be one of the largest industries in the world.

In 1882 Mr. Hoggson discovered the first process for making it non-explosive, which is patented. Since that time he has continued experiments to discover a better and cheaper compound and the result of several years of this work is "Colophite."

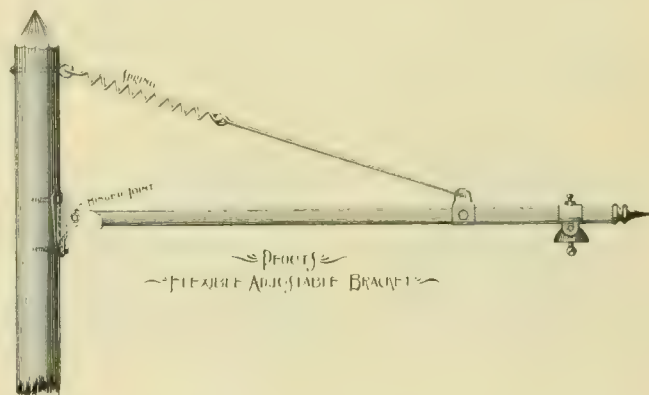
"The adhesive and elastic properties of colophite are so great," says the Billings & Spencer Company, "that it is particularly useful for an insulating compound subject to constant strains and vibration, being unaffected by the atmosphere, and is a natural preservative impervious to the climatic influences of oxygen, snow, ice and moisture, which are the source of decay in perishable substances. A series of electrical tests have been made of the colophite insulation on the Billings & Spencer drop forged link strains, showing a resistance of 200,000 to 258,000 megohms, guaranteed at 575 volts. The crushing strength of the center hard rubber disc is 12,000 pounds. The great advantage claimed for the drop forged material is that all the parts that are subjected to strain or wear are made from material that has a tensile strength of from 65,000 to 80,000 pounds per square inch. Tests made by the Pope Manufacturing Company, Hartford, Conn., on the Emery testing machine."

The straight line hangers are also made with interchangeable parts with an independent colophite insulated stud with $\frac{5}{8}$ inch thread, drop forged of either Tobin bronze or steel. The unique feature of the straight line hanger is a separate bell made of either aluminum bronze or malleable iron, having interchangeable drop forged yokes of either Tobin bronze or galvanized steel for double and single pull-offs and straight line hangers.

The Pettingell-Andrews Company, of Boston and New York, is the general selling agent for the Billings & Spencer Company. Frank X. Cicott is manager of the railway department.

PFOUT'S FLEXIBLE POLE BRACKET.

There is always a certain amount of slack in trolley wires between poles, brackets or points of suspension, and usually the trolley wheel is elevated higher midway between the points of suspension than at suspension points. The effect is that if the points of suspension are rigid, as in all fixed brackets, and practically so with many so-called flexible brackets, the trolley, in passing from the midspan to the bracket and from the bracket to the next midspan, is subject to sudden changes of elevation. The result is said to be an increased pressure on the spring as the wheel approaches the fixed point of suspension, which is suddenly released as the point of suspension is passed, the wheel quickly passing from a downward course to a short horizontal on the fixed insulator, with another sudden change to an upward course



as the insulator is passed, causing a jarring of wire, insulator, ear, and all connecting parts, injuring all of them.

All of these defects, and damage to the overhead construction, are said to be overcome by the use of L. S. Pfout's hinged bracket, manufactured by the Wrought Iron Bridge Company, Canton, O. The manufacturer says: "With the hinged bracket, as the trolley wheel passes the midspan, the bracket arm in front begins to rise, attaining its maximum elevation as the wheel passes under, being restored to its normal position when the wheel arrives at the middle of the next span. By this gradual raising and lowering all hammering and destruction to the overhead construction is avoided, and the trolley remains in contact with the wire." All the advantages of the span system, without its defects, are said to be retained by the use of Pfout's bracket, which is, in fact, more flexible than the span wire, the weight of the wire being, in a measure, counterbalanced, or it can be entirely counterbalanced if desired.

Thomas H. McLean, general manager of the Citizens' Street Railroad Company, Indianapolis, spent two days in Chicago, recently. He was accompanied by Mrs. McLean, and made a pleasant call on the REVIEW.



"Cahall" boilers are described in the latest production of H. E. Collins & Co.

The Scarritt Car Seat Company, of St. Louis, has taken an order for seventy-five cross seats from the Detroit Railway.

The American Electrical Works, Providence, R. I., will supply thirty-six miles of 0000 feeder wire to the Akron, Bedford & Cleveland Railroad.

The Boston office of the Peckham Motor Truck & Wheel Company, at 53 State street, has been moved to larger quarters in the same building, on account of increasing business.

Warren Webster & Co., of Camden, N. J., the specialists in exhaust steam economy, have issued an illustrated catalog of the Webster vacuum feed water heater and purifier, containing over sixty photographic reproductions of testimonial letters.

The Jackson & Sharp Company, of Wilmington, Del., reports business as good, which it certainly is, for a concern so recently in the street railway field. Since resuming street car construction, fifteen months ago, the company has built over 500 cars, and is now turning out 45-foot car bodies.

The Indiana Rubber & Insulated Wire Company, distributed a celluloid wiring calculator at the electric light convention, for pocket use, which is away ahead of wiring tables, both for convenience and rapidity, is ahead of anything yet invented in that line.

The Bass Foundry Company, Ft. Wayne, has orders on its books for 4,000 street car wheels, while the machine shop and corliss engine departments are so full of work they are running 22 hours out of the 24 with enough work in hand to last them ten months.

G. E. Pratt, of the Jackson & Sharp Co., Wilmington, Del., sold 15 40-foot cars equipped with Hunt air brake, Bushnell seats and Dorner & Dutton trucks to the Akron, Bedford & Cleveland and the Cleveland & Elyria Electric Street Railway Companies.

The Inter-State Oil Company, whose Chicago office is at 171 South Canal street, is supplying a number of street railways with its various lines of lubricants and greases and making a good record. The specialties are the "King Bee Cylinder" and "Silver Leaf Dynamo" oils.

The Ohio Brass Company of Mansfield, O., was awarded the bulk of the contracts for trolley wire hanger to be used in constructing the new street railway in Detroit, Mich. Other hangers were offered the railway company but the type K hanger of the Ohio Brass Company was given the preference.

The Metropolitan Electric Company, Chicago, reports business as noticeably increasing. Many inquiries are received for its Mac tape. The Knapp-Sellner adjustable desk lamp holder is also attracting attention. A new carbon battery of high efficiency for open circuit work is being introduced by the company.

Rail scrapers made by Augustus Day were adopted twenty-six years ago by the Detroit, Mich., Citizens' Street Railway Company, and some of those originally purchased are still in use. Mr. Day recently had the pleasure of calling upon the officers of the company and reminding them of their long period of service.

The firm of M. M. Buck & Co., composed of M. M. Buck and A. H. Handlan, dealers in railway and general supplies, at St. Louis, Mo., has been succeeded by the M. M. Buck Manufacturing Company, with M. M. Buck, president; A. H. Handlan, vice-president and general-manager; E. W. Handlan, secretary and treasurer.

The St. Louis Register Company seems to be doing a thriving business, and getting fully its share of orders. Sixty-five double registers have been ordered by the Central Electric Railway, of Sacramento, Cal., 400 are in use at Boston and 300 in New Orleans. All but one of the numerous and extensive St. Louis lines use them.

H. B. Moore, receiver of the Great Western Electric Works at Duluth, Minn., has brought suit to restrain the local directors from ratifying the \$100,000 mortgage given to the American Loan & Trust Company, of Boston; and to have the mortgage and bonds declared null and void in order that all the creditors may stand on an equal footing.

Charles A. Schieren & Co. have sold 125 feet of sixty-eight inch three-ply belt to the Trenton Passenger Railway Company, Trenton, N. J., and seventy-eight feet of forty-two inch three-ply belt to the Brookline Gas Light Company, Brookline, Mass. The firm reports an increasing demand for its goods, the quality of which is being kept up to the highest possible standard.

The Forest City Electric Works, of 17 Champlain street, Cleveland, O., have installed special machinery for the manufacture of their "Roll Drop" brand of commutator segments. By the mechanical process of the Forest City Works, castings of pure lake copper are rolled and pressed to size, giving a dense accurate bar, which is said to be superior to most others.

We are in receipt of the verbatim proceedings of the International Tramway Union meeting held at Cologne, August 21, 22, 23 and 24, 1894. It comprises 269 pages of about the REVIEW size. If length of proceedings is any criterion of the amount of work done by our brethren across the Atlantic, our boasted American street railway systems will have to look well to their laurels.

J. S. and F. B. Houston have retired from the firm of George T. Houston & Co., hardwood lumber dealers, Twenty-second street and Center avenue, Chicago. George T. Houston retains the Chicago yard and the two saw mills, while his brothers take the Cairo, Ill., yard. George T. Houston is cutting lumber suitable for car builders' use, which will be in shipping condition this summer.

The Composite Brake Shoe Company, of which shoes the King & Andrews Company, Chicago, are the western makers, is calling attention of managers to the special merits of these shoes as an antidote for skidded wheels. The action of the composite shoe is to furnish the maximum adhesive contact between shoe and wheel without locking the wheel and causing it to skid and wear flat, especially where much sand is used.

The Daniels steel tie, made by the Daniels Steel Railroad Tie Company, of Youngstown, Ohio, is in use at Terre Haute, Ind., New Castle, Pa., and Cincinnati, O. This tie was described in the REVIEW several months ago and was the tie laid with the all steel track described by President Harrison of the Terre Haute Electric Railway before the American Street Railway Association. It is rolled from old rails and is of about the same price as a good wood tie.

The Westinghouse Machine Company, Pittsburg, is having a large foreign business with its steam engines. The company reports the sale and shipment of a 150-horse-power compound of the latest type to Alaska; three 150-horse-power compounds to Mexico; 200-horse-power compound to Spain; 300-horse-power compound to France; 150-horse-power compound to Buenos Ayres; 800-horse-power compound to Havana, Cuba, besides several smaller engines to Russia and other countries.

Street Railway Investments, by Edward E. Higgins; published by the Street Railway Publishing Company, Havemeyer building, New York: price, \$2. This is a work of 102 pages, treating briefly of the different classes of street railway investments in large and small cities and interurban lines. For convenience, the roads of the country are divided according to the size of their cities, into nine classes, and a separate chapter is devoted to interurbans. Some statistics are given as to capitalization and earnings.

A Cradock rope has again broken its own and all other records in the down town and tunnel loop of the North

Chicago Street Railroad. The latest record is 135 days. The rope in question was started October 21, 1894, and taken out March 4, 1895. It therefore had the worst season of the year, on account of snow storms. The winter, as all know, has been an unusually severe one. When these ropes were first used on this loop, 88 days was thought to be a wonderful record, but the Cradock people have been steadily beating themselves, until 135 days has been reached.

Heine safety boilers have been selected by the United States government for the equipment of the new Mississippi river dredge boat. For service on this boat the boilers are required to be not only compact and economical, but also able to use the extremely muddy water stirred up by the dredging operations. The special Heine mud drum permits the deposit and removal of a large percentage of sediment before the feed water reaches the boiler proper. The selection of its boiler by the government engineers is considered a compliment by the Heine Safety Boiler Company, of St. Louis.

Elmer P. Morris, of Morris & MacCurdy, of Indianapolis, was at the electric light convention, exhibiting the new Phoenix insulating paint, which is also fireproof. Magnet wire, covered with this paint, was heated in the flame of a torch and came out unscathed. Many other tests were made, showing the fireproof qualities of the paint. The paint is evidently a good thing, and Mr. Morris has taken many orders. A paint combining insulating and fireproof qualities is of great value and by no means common. It will be more common in future, however, if orders continue to pour in for Phoenix paint.

Charles N. Wood, 180 Summer street, Boston, Mass., is the New England agent for the R. D. Nuttall Company, R. A. Crawford Manufacturing Company, and H. Van Buren & Co., besides doing on his own account a large and increasing business in second-hand electrical machinery of all kinds. He is prepared to fill orders for complete electric railway outfits. Those wishing either to buy or sell second-hand apparatus, will do well to consult with Mr. Wood. The sale of supplies has necessitated removal to larger quarters, which fact is not surprising, in view of his reputation for square dealings and good bargains.

The Detroit Railway Company, Detroit, Mich., will let contracts for engines within a week. The following contracts have been let: Forty miles grooved girder rails 85-pound section, Cambria Iron Company; 100,000 oak ties, Lansing Spoke Company and D. L. & N. R. R.; seventy-five car bodies of the combination type, seats face front side aisle and entrance, St. Louis Car Company; trucks, J. G. Brill & Co.; motors, Westinghouse Company; 2,000-horse-power generators, Walker Manufacturing Company; overhead material, Ohio Brass Company. It is proposed to complete forty miles of track this season.

The Walker Manufacturing Company, Cleveland, O., has closed the following contracts since the first of the year: Two 50-kilowatt belted lighting generators, the Complete Electric Construction Company, New York city; 100-kilowatt belted generator and three double car equipments, 25-horse-power steel motors, Rahway Electric Railway Company, Rahway, N. J.; three 400-kilowatt belted generators and switchboard apparatus, two double car equipments, 25-horse-power steel motors, Philadelphia Construction Company, Philadelphia, for Schuylkill Electric Railway Company, Pottsville, Pa.; one 200-kilowatt belted generator, six complete car equipments, 25-horse-power steel motors, Michigan Electric Company, for Saginaw Consolidated Street Railway Company, Saginaw, Mich.; two double car equipments, 50-horse power and two double car equipments, 25-horse-power steel motors, Hartford & West Hartford Street

Atlanta; and many large orders for general work, among them being four 2,000-ton steam and hydraulic cotton compresses for W. W. Bierce, Montgomery, Ala.

NEW CAR OF THE READING & SOUTHWESTERN.

The double truck car represented in the engraving is a sample of an order just filled by the Jackson & Sharp Company, of Wilmington, Del., for the Reading & Southwestern Street Railway Company, of Reading, Pa. The car is 40 feet over all, designed to carry baggage as well as passengers. The baggage room is a part of the vestibule. The credit for the design and construction of the car body belongs to the Jackson & Sharp Company, but the plush back reversible seats were furnished by Hale & Kilburn, of Philadelphia, curtains by the McKay Cur-



NEW CAR OF THE READING & SOUTHWESTERN.

Railway Company, Hartford, Conn.; one 150-kilowatt belted generator, three double car equipments, 50-horse-power steel motors, C. E. Loss & Co., Chicago, Waukesha Street Railway Company, Waukesha, Wis.; two 400-kilowatt and one 750-kilowatt direct coupled generators, Detroit Railway, Detroit, Mich.; two 225-kilowatt direct coupled generators, Gloucester, Essex & Beverley, Street Railway Company, Gloucester, Mass., and sixteen double car equipments, 25-horse-power steel motors, Worcester Construction Company, Worcester, Mass., for same company; two 200-kilowatt belted generators, five double car equipments, 30-horse-power steel motors, Jasper County Electric Railroad Company, Carthage, Mo.; also spring mounted steel motors for Louisville Railway Company, Louisville, Ky.; Atlantic Avenue Railway Company, Brooklyn; Steinway Railway Company, Brooklyn; Ottumwa Electric Railway Company, Ottumwa, Ia.; Aurora Street Railway Company, Aurora, Ill.; Bloomington City Railway Company, Bloomington, Ill.; Kansas City Railway Company, Kansas City, Mo.; Atlanta Electric Railway Company,

Wilmington, Lewis brake handles, and sand boxes by E. F. DeWitt & Co., Lansingburgh, N. Y. The finish of the car is in cherry.

The running gear consists of the Empire State radial trucks made by the Taylor Electric Truck Company, of Troy, N. Y., and two 50-horse-power motors made by the Walker Manufacturing Company, of Cleveland, O. The trucks have 33-inch wheels on 4-inch axles.

Like all trucks made by the Taylor Electric Truck Company these have a coil spring above each journal box and elliptic springs for the car body suspension. In the center of each truck on each side of a continuous frame are placed the four elliptic springs fastened to the cross bar, and upon these springs, but not fastened to them, is placed the truck bolster, having curved side bearings. The car is fastened to the truck by a king bolt passing through a male and female center plate which is secured to the bolster, and the center plate receives the entire strain and weight except that due to rocking which is sustained by the curved side bearings on the ends of the bolster.

PICTORIAL EVENTS OF A MONTH.

Steam is surely beginning to be pushed out of the ring, especially for suburban service on roads where there is a great deal of travel. The Nantasket branch of the New York, New Haven & Hartford Railroad, is being equipped with electricity. The Pennsylvania Railroad may change the motive power on one of its branches, and other roads are contemplating a change, while all are watching the Nantasket experiment.

Brooklyn's great strike has ended in complete victory for the companies.

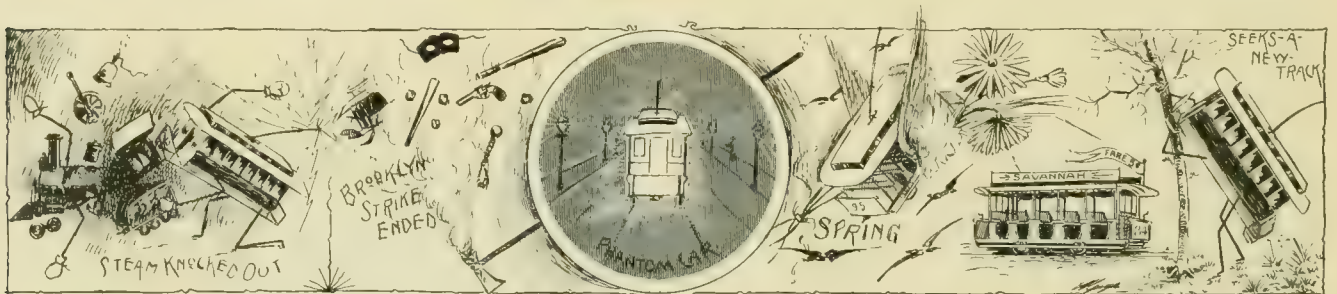
Waco, Tex., citizens saw a phantom street car rushing down the steep grades the other night. It seemed rather substantial to the motorman whose car stopped it,

fares as they see fit. The judge holds that a court of equity can interfere to prevent destruction of property of a chartered public servant by ruinously low fares under the guise of competition.

At Jamestown, N. Y., an electric car got tired of moving over the same rails day after day, so started out on an exploring expedition. Attempting to follow Emerson's advice, "Hitch your wagon to a star," it climbed a tree and came to grief.

PERSONAL.

S. M. Brewster, of Chicago, has taken charge of the electrical and mechanical departments of the Merrill Railway & Lighting Company, Merrill, Wis.



proving to be an abandoned truck that had been placed on the rails at the top of a hill and permitted to run down. Little damage was done.

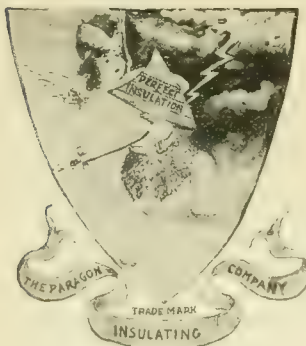
Spring has come again. Construction work is progressing rapidly in some sections of the country, and open cars are being made ready for their work.

At last the end of cheap fares at Savannah seems to have arrived. Judge Speer, of the United States court has passed an order allowing the receivers of the Electric Railway Company to operate its lines at 5 or 3 cent

P. F. Leach, the genial hustler of the Bass Foundry Company, Ft. Wayne, was a REVIEW caller last week.

W. J. Hield, general manager of the Twin City Rapid Transit Company, Minneapolis, called on the REVIEW while in Chicago a few days ago.

A. Langstaff Johnson, consulting engineer of the Hes-tonville, Mantua & Fairmount Passenger Railroad, of Philadelphia, called at the REVIEW office this month.



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H. H. WINDSOR,
Editor.

F. S. KENFIELD,
Business Manager.

CORRESPONDENCE

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

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WE have heard of cases of poor bonding causing run-aways by shocking horses that were unfortunate enough to step on live rails, but the most aggravated case of "poor return" that has yet come up is reported from a small road which operates over a draw bridge and on which an order has been issued for no car to go on the bridge while any horses are on it. The reason for the order was that it was found that horses on the bridge would frequently receive shocks and run away from stepping on live rails when cars were on the bridge. What a state of affairs! The road should invest in a few dollar's worth of copper.

EIGHT miles an hour as the maximum allowable speed within the limits of a city is something that would be laughed at by the majority of cities, especially western ones. Nevertheless such is the present limit of speed in Brooklyn, and to make matters worse as low as six miles an hour is required within certain districts. Brooklyn is a little slow in getting over its horse car days. That is all. When it gets educated up to the lively tune of the trolley it will think twenty-three miles an hour none to fast for outlying districts and will have no patience with an eight mile gait except on a few of the most crowded blocks.

WHY employes of street railways should object to purchasing uniforms of the company tailor, it is difficult to understand. Companies make their arrangements for

the protection of their men, securing a better grade of cloth and workmanship than can be obtained from other tailors. The same money put in a suit not a uniform will not buy as good a garment, either as to lasting quality, durability, or looks, as that of the company's tailor, because the latter bases his purchases of cloth on the understanding that he will use a large quantity, so gets a better quality than the small tailor, who cannot afford to buy a good quality of cloth, because his price is so low.

WE are glad we are not one of the stockholders in the tramway at Cardiff, Wales. The corporation, otherwise the town, has concluded to "purchase" the road and run cars on its own account. As usual the alleged purchase is a polite synonym for confiscation, which in this case is aggravated by the decision of the council to take the cars and tracks but not the several car houses and barns. Second-hand car barns are in such brisk demand, and being so valuable and available for a thousand purposes, we presume the council consider their act a generous concession. The cars could be left out in the street, since the streets belong to the town, and as for the horses, well, tents might do in their case; but in this country the average conductor would not know where he was going if not to "the barns."

It is getting to be the fashion for ministers to mix in something of which they know nothing. An epidemic has broken out in Brooklyn, Pittsburg and Philadelphia, which results in the preachers taking up the cudgel in behalf of the "poor down-trodden motorman and conductor." If they were requested by the men to plead for them, it might be legitimate, but in any event, they should make their complaints and pleadings to the officers of the companies, where they would do some good, and not waste their wind in preaching from the pulpit to people who have no interest in the controversy, and could do nothing, if they had. Many preachers go off half-cocked on ex parte statements, that are mere rumors, while, if they knew both sides of the isolated cases that arouse their sympathies, they would not make such asses of themselves.

Do those who advocate the municipal ownership of street railways realize what the first effect in this country would be if they should see their dreams accomplished? From a tax payer's standpoint, the theory is fine, but practically it doesn't appear quite so desirable. It is apparent that the governing power would have control. The large cities have had so many examples that they know that the governing power means the gang, and that the railways would be used as an additional wheel in the political machine. Whatever of profit might accrue to the municipality if the lines were properly run, would be sure to be diverted into the pockets of its members by the unprincipled gang, which would be perpetual on account of the means which the people had placed in its power to enable it to hold its position. The people would be worse off than they think they are now under

existing conditions, for their servants, really their masters, would not cater to their comfort, as do the street railway managers of to-day.

THERE has always been much complaint on the part of those who do wiring for electric light in buildings, that architects do not make proper provision for such wires. A similar complaint has been urged against the builders of cars for electric traction. It is undoubtedly true that the majority of cars built for electric service have very scanty provisions for the car wiring and other minor apparatus. The fact that electric light wires can be put in an old building and motor wires in an old car does not mean that the job would not be improved if the car or building were built with reference to such wiring. We have even heard of cases where it was impossible to get sand boxes on a car which was built for an electric road, so little provision was made for the apparatus that goes in after the car is finished. It is now generally known when a car is ordered, what the requirements will be, and there will be fewer makeshifts on a car when it is put on the road if the car builder will co-operate with the supply men who come "after him." Buyers of new equipment should see to this.

In cities where there are several competing companies there is liable to be at first, such a scramble for routes and franchises that after a few years a very undesirable state of affairs exists as regards the number of curves and crossings on various routes. In other words the legal department has more to say than the mechanical department and in a few years the road finds itself with a lot of lines so full of curves and crossings that rapid service is an impossibility, to say nothing of the expense of keeping up special work, both track and overhead, and the extra maintenance account on cars and motors. Such a tangled up state of affairs exists in a few cities and a word of warning is not out of place to those that are getting themselves into the same undesirable position. We do not want to hurt the business of our friends that make special work but there is enough for them to do outside of the unnecessary crossings and curves that exist in too many places. Under the stress of competition a company will do many things that are not in accord with a wise judgment and the policy of getting franchises, whatever the route and whatever the cost may leave it in a worse position than if it never had obtained the franchises.

THE labor unions of Milwaukee recently met and decided with earnest and "absolutely unanimous" vote that the proposed plan to vastly increase the efficiency of the postal service in that city, was "but another step in the direction of enslaving the laboring masses in the community." The "enslavement" would appear to lie in the increased liability which rioters would incur should they incline to resort to mob violence, as has been tried unsuccessfully in several places, in attempting to dictate how the road shall be run. If the resolutionists really fear a reduction in wages they have themselves taken the one

step which of all others will most surely and effectually bring about a decrease in pay. They demand a 3-cent fare and urge all organized labor to work for the accomplishment of this result. In these times street railways operating in the larger cities have all they can do to pay fair wages on the basis of the prevailing 5-cent fare. If, then, this revenue should be cut 40 per cent it is very evident that purchasing fuel and supplies at the bottom notch and paying small dividends, at least half the forced economy must fall upon the employes even if no dividends at all were paid. It looks very like an attempt on the part of the trades council to seek reduced fares at the expense of their fellow workmen employed on street railways.

JUDGE HANEY, of Chicago, discharged three jurors for saying they would not give a corporation the same consideration they would extend to an individual, particularly if the individual was a mechanic. The appellate court has reversed a judgment for \$25,000 damages against the City Railway, not because of errors in law as given by the court below, nor because the facts did not sustain the verdict, though these were conflicting, but because of the conduct of the counsel for the plaintiff on the trial of the case. The counsel accused the railway company of bribing witnesses, and repeatedly referred to its witnesses as being paid for their testimony. In other ways unsustained by evidence, they excited and inflamed the jury against the railway company. Side remarks reflecting on the company and tending to prejudice the jury were constantly interjected, all of which the appellate court considered to be improper. For this misconduct of the lawyers the court reverses the judgment and sends the case back for a new trial adding this very pregnant sentence, "Counsel will not indulge in such conduct if they understand that verdicts thus obtained will not be sustained." We are glad to publish this information and trust that it will be remembered by all of our readers. It is about time some protection was afforded corporations for the insinuating actions and slurring remarks of unscrupulous personal injury lawyers, who would not know how to conduct a case, if they were restrained from using their method of influencing a jury. The witness, too, deserves some protection from the court, just as much as if he was a plaintiffs' witness, yet no one thinks of asking the latter if he is paid for his testimony. The plaintiff in a personal injury suit usually begins the trial with the jury in his favor anyway, and a strong case has to be made by the defense if it expects to get a verdict.

As electric railroading becomes a more settled industry, the education of employes will probably receive more attention than it has formerly. There are now very few managers that do not fully realize the importance of this, but we have only to look at the systems of some large steam roads to realize that there is room for great progress still, as far as electric railways are concerned. A most excellent idea, which can be borrowed from some steam road practice, is that of asking ques-

tions of employes about the many practical, every-day operations which all are familiar with. These questions are not simply examination questions, but are of such a nature that they set men to thinking, and the answers made by the employes are of great help to the superintendent in solving problems as to the superiority of this or that method of operation. To illustrate, we quote a few from the motive power department of a steam road: "Is there any unnecessary movement of light engines? Are any more engines kept in service than the traffic seems to demand? Do the trains seem properly loaded from the motive power standpoint, so as to get the best work out of the engines? Can shop office methods be improved on to keep all necessary records at less cost?" It will be seen that the questions cannot fail to set the men to thinking, in a way that would be impossible under mere instruction, which is liable to go in at one ear and out at the other. It is one of the characteristics of a good manager that he educates his men to not only do their duties, but assist him in solving many problems as to the best methods of operation. The poor manager is the one who knows it all himself. On a street railway system there is a splendid opportunity for the meeting of employes for instruction and consultation—much better, indeed, than on steam roads, and superintendents should take advantage of this condition of affairs.

In proportion to the number of electrical engineers in the country that make a specialty of electric railway work in general, the number of civil engineers who have a special practical knowledge of electric railway track work is very small. The reason of this is not far to seek. There is very little demand for the services of this class of engineers. The most expensive part of a street railway plant has to take care of itself along with many other commonplace details. A friend of ours who is track engineer on a system which does not do its track work on this plan, writes us a letter which we can not refrain from quoting. Before doing so, however, it may be well to state that the gentleman says that he is "not out of a job" and therefore his remarks are unprejudiced. He says: "Let me suggest that you impress upon your readers the necessity of employing a practical civil engineer with a special knowledge of street railway and especially electric railway requirements. In a great many instances all that is considered necessary is a man who can 'run an instrument' to 'survey the road' as the expressions go. I venture to say that the millions which have been and are being spent in reconstruction are largely due to faulty building at the start, and want of a clear knowledge of what was required and still to-day there are different companies throughout the country spending large sums on reconstruction and leaving it almost entirely to contractors, inspectors, or trackmen, ignorant of all the principles of engineering. We do not put up our buildings and large business blocks without employing a competent architect and spending thousands of dollars upon the plans, specifications and inspection. Are the millions placed in business blocks and

houses more valuable than the millions that are put into street railway enterprises? Of course not, but many street railway men are not educated up to this point." We might also add that many electric railway owners do not seem to be educated up to the point where they seem to be capable of profiting by their own or other people's experience.

THE steady increase of the length of cars mounted on single trucks, has necessitated some move to reduce the shock on striking curves. This shock, besides being very uncomfortable to passengers, is an enormous strain on trucks, wheels and car bodies, to say nothing of the wear on the track. With horse cars, anything that would keep a car on the track while it went around a corner, answered the purpose. In electric road practice the speed around curves, even with the best-trained employes, made some means of relief an absolute necessity. It has only within a year or two begun to be realized that horse road practice must be entirely abandoned. There is, however, a marked change in the more recent work from that formerly laid. The adoption of the transition curve is the most important reform that has taken place, and it is surprising, in consideration of the undoubted superiority of these curves, that they have not been exclusively adopted before. It is hard for a man who has been used to the jerk of single radius curves for many years, to realize that it is possible to build curves in such limited space that will give so little shock as will well designed transition curves. There is also a tendency at present to build curves of much longer radius, bringing the tracks down near to the curb. There are many wide streets on which the curves laid have been of unnecessarily long radius. In narrow streets it is not always easy to get permission of the authorities to cut off a corner of the sidewalk, but the increased comfort of the street car traveling public ought to be a strong argument with the city officers in granting permission to do this. The double truck car, toward which there is a tendency at present, of course affords great relief from curve jerks, but all managers are not yet ready to accept the double truck car. Almost nothing has been done in the way of constructing single truck cars to remedy the evil, although there is a prospect of more future improvement along this line than along any other. The West End road, of Denver, has some long cars mounted on a swivel between the truck and car body, as arranged by the superintendent. It would not be surprising if some form of single truck, with limited swivel, was put on the market before long.

Mail service has been established on the Snyder Avenue and Chestnut Hill line of the People's Passenger Railway Company, Philadelphia. The route covers 23.73 miles of track and includes ten postal stations. The mail clerk on the car will distribute letters to carrier's routes as well as stations. By thus sorting in transit a saving of time and quicker delivery will be effected.

PROTECTED ITS FRANCHISE.

The Chicago City Railway Company Prevents the Chicago General Street Railway Company From Hauling a Car Over Its Tracks—Legal Point Raised of Vital Importance to Every Street Railway in the United States.

* * *

Just then a scout came flying,
All wild with haste and fear;
"To arms! to arms! C. C. R. Y.,
That West Side Car is here."
On the car track to the westward
City Railway fixed its eye,
And saw the swarthy storm of dust
Rise fast along the sky.

* * *

Fast by the General's standard,
O'erlooking all the war,
Larry McGann, the Congressman,
Sate in his open car.
By the right wheel rode Carl Bonney,
Prince of the Bonney Line,
And by the left Bill Brennan,
That wrought the dreadful crime.

* * *

The City Railway's eye was sad,
The Railway's speech was low,
And darkly looked it at the car,
And darkly at the foe.
"Their car will be upon us
Ere the castings breaketh down,
And if they once may win the bridge,
What hope to save the town?"

Then outspoke M. K. Bowen,
The 'tendent of the gate:
"To every man upon this earth
Death cometh soon or late;
And how can man die better
Than facing fearful odds,
For the ashes of his fathers
And the temples of his gods?"

* * *

"Hew down the car, ye shopmen,
With all the speed ye may;
I, with two more to help me,
Will keep the foe in play.
In yon straight road a thousand
May well be stopped by three;
Now, who will stand on either hand
And keep the bridge with me?"

* * *

When wrecking crews and shopmen,
Conductors, gripmen too,
And the office force, so merrily
Do take their hour for noon,
With weeping and with laughter
Still is the story told,
How well Supt. Bowen kept the bridge
In the brave days of old.

—With apologies to Lord Macauley.

"Stop!"

Supt. M. K. Bowen stood on the west end of the east approach of the Twenty-second street bridge, with a red carnation in the top buttonhole of the left lapel of his spring overcoat, and his right hand uplifted, as if he were making an affidavit.

He was addressing Superintendent W. F. Brennan, of the Chicago General Street Railway Company, who

stood on a car on the bridge, the horses being on the east approach.

"Why should I stop?" asked Mr. Brennan.

"Because these tracks do not belong to you; they belong to the Chicago City Railway Company, and I, as superintendent of the company, warn you not to trespass," said Mr. Bowen.

"Have you an injunction, or any order of court, or any written authority to keep us off?" asked Mr. Brennan.

"I have not," replied Mr. Bowen.

"Drive on," said Mr. Brennan to driver Harry Boyles, and the car started down the approach.

Then the fun began. Mr. Bowen hurried down the approach, waving his hand in the air. Three City Railway wreck wagons came dashing towards him. A wagon loaded with motor casings labored out of Grove street, and turned east on Twenty-second street. Just as the front wheels reached the middle of the north track a wheel came off, landing the heavily laden wagon across both tracks. Car 259, the lone car that runs on the City Railway tracks, was on the south track. The conductor had his hand on the bell cord, and was in the act of ringing the signal to start on the eastward trip. He heard the wild ringing of the gongs of three wreck wagons, and saw a crowd of men in overalls and citizen's dress, rushing after the wagons, toward the bridge, and waited.

Car 306, of the Chicago General Company, proceeded down the south track of the east approach of the bridge. Within 50 feet of the bottom it stopped, because the Chicago & Alton Railroad has a track in Grove street, at the bottom of the approach. Conductor John McDonald ran ahead, as provided by a city ordinance, to see if the crossing was clear.

He couldn't see the crossing for the wreck wagons and the phalanx of rushing shopmen from the City Railway shops at Twentieth street had got between him and the track.

CONFLICT BEGINS.

Wreck wagon No. 1 A drove to the rear of the car and one of the crew jumped off with the grappling hook.

"Hook on to her," shouted Mr. Bowen, becoming excited.

The man hooked.

"Pull her off the track," he shouted.

The driver of Wreck wagon No. 1 A whipped up his horses, while driver of Wagon 2 B was trying to get near enough to put another hook on the rear platform. The car moved backwards, the driver standing at his post and allowing his horses to back with the car. They did not move fast enough to suit Mr. Bowen, who struck one of them on the flank.

It took only a moment to get the car off the track, when the shopmen took their places and began to lift her.

"That's right, pull her over," was Mr. Bowen's next order, and over she went.

"Now take your axes and break it all to hell," shouted



1. Eager for the fray. 2. Only waiting. 3. Lost a wheel. 4. "Stop!" 5. "Drive on" 6. "Hook on to her" 7. Back she goes. 8. Shattering coming gear. 9. Pretty work with sledge. 10. Home at last.

Mr. Bowen, very much excited. Two hundred men from the shops did some fine work with sledge and bar, and 10 minutes after it started on its journey of 400 feet, the car was unfit for service.

CONFLICT IS OVER.

Pres. McGann, of the Chicago General Street Railway Company stood on the sidewalk watching the riot and urging his men to make no resistance. Hundreds of residents of the neighborhood whom he had known for fifteen years and more, were urging him to let them sail into the wreckers. He had only to give the word and there would have been the prettiest fight on record, with many enforced baths in the cold dirty water of the Chicago river.

Meantime, Police Officer Nolan had been trying to obtain reinforcements from headquarters. Mr. McGann notified him that the street was obstructed and he wanted the obstruction removed. Officer Nolan looked at the wagon of motor castings on the track and thought he couldn't lift them without help, so he called more police officers.

Before the car was entirely destroyed, a patrol wagon loaded with officers came rushing up. Officer Nolan placed some of the employes of the City Railway under arrest.

President McGann said to the officers, "These men are obstructing the street."

Mr. Bowen said to the officers, "Do you want this obstruction removed?"

The officers replied that they did.

Mr. Bowen started to force his way through the crowd to order his men to clean up the wreck. When he reached the car he said:

"These men are under arrest, I understand, how can they do any work?"

Then the officers discovered that no one was under arrest.

"Clean her up boys," said Mr. Bowen, and in another minute the remains of the car was shoved on one side of the road.

The strife was o'er without bloodshed, but Mr. Bowen had lost his red carnation.

"Aren't you going to take your car back?" asked the REVIEW man of President McGann.

"We have nothing to do with it," he replied, "They have confiscated it."

CAUSE OF THE INVASION.

Thus, on the morning of April 4, 1895, was brought to an issue one of the most novel and important legal points involving street railway franchises, which if confirmed by the courts will effect every street railway in the United States. C. C. Bonney, the legal adviser of the Chicago General Street Railway Company, and his son, C. L. Bonney, vice-president of the company, discovered the point. They say the title to the tracks of street railway companies as soon as laid in a street is in the city, and that the charter of the street railway com-

panies gives them only the right to carry passengers, the same as omnibuses, cabs or hacks, which use street railway tracks as often as they desire. The Chicago General Company wants the courts to decide the difference between a vehicle with four solid wheels, and one with wheels made of spokes. If there is no difference the company believes it has the right to run its cars over the tracks of any other company and any other company has the right to run its cars over the tracks laid by the Chicago General Company and if the Chicago General Company has no right to do as it thinks, it wants to know it.

The Chicago General Company has a franchise on Twenty-second street east to Grove street, which is at the bottom of the east approach to the Twenty-second street bridge. The tracks on the west approach and on the bridge were laid by the Chicago General Company, while those on the east approach were laid years ago by the City Railway, which has run a car from Cottage Grove avenue to Grove street ever since. In the west side of, Grove street, the Chicago & Alton Railroad has a single track. It was the plan of the Chicago General Company to run a car over the City Railway tracks to Wabash avenue, about half a mile, thence north on the Wabash avenue line.

The owners of the electric road claim that the Chicago City Railway Company has no right to run cars in Wabash avenue, as in 1863, the road entered into an agreement with the city giving up all its rights in Wabash avenue and agreeing not to construct a line in the street between Twenty-second and Madison streets.

Two years later the legislature incorporated this agreement into a charter which was extended for ninety-nine years. When the new constitution went into effect, it declared that no special charter should be altered or amended.

December 21, 1874, the south side company induced the council to grant a franchise for the use of Wabash avenue from Twenty-second street to Madison street. Men began work at midnight Saturday, and the two miles of track were completed before court opened Monday morning and cars were running. An injunction was thus avoided.

The claim was made by the Chicago General people that the council of Chicago is not a body of sufficient importance to do away with the action of the state legislature. They also contend that Wabash avenue is a state road and was such long before Chicago had a council. They argue that the city has no authority to give franchises on state property.

The Chicago General Company had the word "otherwise" put in its franchise, which gives them the right to acquire the use of the tracks of other companies by contract, lease or otherwise. Failing to contract or lease, the company determined to try "otherwise." Several days before the attempt was made, it was announced that at 10 o'clock on the morning of Thursday, April 4, the Chicago General Company would run a car over the City Railway tracks on Twenty-second street to the

Lexington Hotel, where a party of gentlemen would be in waiting to be taken over the Chicago General Company's lines to inspect an electric brake.

PREPARING FOR THE FRAY.

Great preparations were made by both companies. On the west side of the bridge, President McGann and Secretary L. C. Bonney were waiting for the car that was to make the trip. At 10 o'clock the car was on hand, but the horses did not arrive until 10:20. On the top of the east approach stood Superintendent Bowen of the City Railway Company, like Horatius the noble Roman, who so bravely defended the bridge. At Grove street were three wrecking wagons of the Chicago City Railway, and car 259, while across both tracks was a wagon minus a wheel, and loaded with old motor casings. Had an attempt been made to remove it, the task would have been difficult. Representatives of each line stood on their respective sides of the river waiting for the start, while two laborers cleaned the dirt out of the tracks.

At 10:20 the start was made, and at 10:30 car 306 of the Chicago General Street Railway Company was in splinters at the side of the road. This car has a history. It has been used to hold down all the franchises of its owners, but will do so no more. The practice has been to lay a couple of rails, put the car on them, lay two more and shove the car on, moving it ahead as fast as rails were laid, and back and forth over the tracks. The men who smashed it did some pretty work with the sledge, breaking a segment 21½ inches long out of one wheel and 15½ inches long out of another.

The passengers were President McGann, Secretary L. C. Bonney and Superintendent W. F. Brennan, of the Chicago General Street Railway Company, J. W. Farwell, several representatives of the daily newspapers, and a member of the REVIEW staff.

PRES. MCGANN TALKS TO THE CROWD.

When the last of the City Railway forces had disappeared, taking with them the truck with its load of castings, under which the wheel had been replaced, a crowd gathered around Mr. McGann asking him what he would do now.

"I will do what I have been doing for some time," he said, "I will keep up this fight until the city of Chicago is declared the owner of every foot of street car track that lies in the streets. This is a red letter day for the movement for municipal ownership. We asked the old companies to give us a railroad to Lawndale. They refused, and we undertook to build it for ourselves. They fought us every foot of the way and you have been given an illustration to-day of the manner in which they opposed us. They did not wait for our car to get off our own tracks before they destroyed it. We paid for the very track on which this thing has been done. When things have come to such a pass there is only one remedy for the people, and that is municipal ownership. We are ready to have our tracks appraised now."

CITY RAILWAY'S POSITION.

Supt. Bowen, of the Chicago City Railway Company, said: "I learned through the newspapers that an attempt was to be made to run a car over our tracks. I made up my mind that it should not be done. I had no opinion from a lawyer. I simply knew that what I considered an act of trespass was to be committed, and I acted within what I thought and still think were my rights. I ordered the men whom I needed to come along; in number they were 400 or 500. The horses drew the car over the bridge, and as soon as their feet were planted on our track, I went to their heads, held up my hand, and ordered the driver to stop. He stopped, and the superintendent of the road came up to me and asked me if I had an injunction. I said, 'no.' Then he turned to the man on the platform and said, 'Drive on.' The car struck our tracks and started down the incline. I turned to my men and ordered them to hitch the wrecking wagons to the car. This was done, the car was pulled from the tracks, turned over and broken up.

"The men with me, were chiefly laborers. Our chief supervisor, Robert Stuart, was there, but I had no policeman nor any man from a private agency. Our supervisors are special policemen, made such so that they may have some authority when refractory teamsters block the track or when there are disturbances on the cars. In three years there has been no trouble growing out of any exercise of authority on their part.

"I was the one who told the police officers that no peace had been broken and that it would be foolish for them to interfere. I am not watching for any more cars, and my belief is that it won't be tried again."

CHICAGO GENERAL'S POSITION.

C. L. Bonney, vice-president of the Chicago General Railway Company, and its legal adviser, said: "The action taken by Superintendent Bowen was not the remedy, if remedy be needed, that the law provides. The destruction of our property took place within the limits of our ordinance. The car was wrecked west of Grove street. We acknowledge it was on rails laid by the City Railway, but the right of way was our own." Here is the section of the ordinance that gives us the right of way:

"Consent is hereby given, permission granted and authority duly vested in said company, its successors and assigns, to lay down, construct, operate and maintain a single or double-track street railway as follows: Upon that portion of Twenty-second street lying between the east line of Grove street and the west line of Johnson street."

You can see from this that there is not the slightest question that the depredation was committed within the limits of our franchise. Even if we should concede a point, there is another section of the ordinance upon which we can make good our cause. It reads:

"Said company shall have the right to connect its tracks with those of the Chicago City Railway Company on Twenty-second street at or near Grove street, but shall have no right to construct any tracks east of the Chicago river on said street without the consent in writing of said Chicago City Railway Company. Said company shall also have the right to operate its cars over tracks not owned by it upon such terms and conditions, by lease or contract, as may be agreed upon between the

companies owning such respective tracks, or otherwise, not in conflict with any of the conditions of this ordinance or the general ordinances of the city; and provided further, that the rate of fare to be charged upon the lines herein authorized, or over which said company may so operate, shall not exceed 5 cents for one continuous ride for any distance within the present or future city limits."

The ordinance says simply that we shall not construct any tracks east of the Chicago river. From the reading of the rest of the section I think it will be seen that we have the legal right to run our cars as we attempted. If what happened on April 4 does not furnish us with the basis of a test case, we have two more cars which may be used in the same kind of service as the one which suffered. We also rely on the constitutional provision, which declares all railroads to be public highways. A test case will be arranged before the first of next month.

This occurrence shows the value of the camera in personal injury cases. The views shown were taken by a member of the REVIEW staff, and a number were also taken by Mrs. C. L. Bonney, wife of the vice president of the Chicago General Street Railway Company. The Eastman Company, Rochester, N. Y., has just placed on the market an excellent kodak, which holds a plate 6 x 8 inches. It contains many improvements and is made especially to facilitate the work of claim agents and others, whose business it is to secure evidence. We recommend our readers to look into this matter, as we are firmly convinced that it will be to their advantage to add a camera to their claim department force.

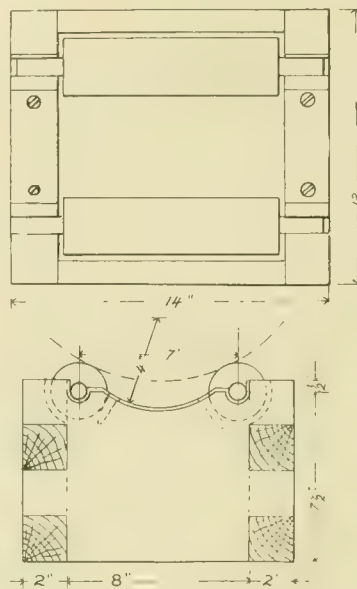
ELECTRIC BRAKES ON TRAILERS.

The trail cars of the Chicago General Railway on Twenty-second street are being equipped with an electric brake, operating on the same principle as the electric brakes which have been on the motor cars of that road for some months. On the trailer the brake magnet, instead of acting against a wheel cast with a special disk, acts against a special disk placed in the middle of the axle. The trailer brake magnets are connected in parallel with those on the motor car and supplied with current from the motors acting as generators. A small resistance is provided with the trailer outfit, so that the amount of current taken by the trailer brake can be adjusted to the weight of the trailer. Connection between the trailer and motor car is made by a double pole trailer plug between the platforms. A double pole plug is used so that the ground wire from the trailer brake can be brought back and grounded on the motor car. If the ground wire was grounded on the trailer, there might be an unsteady action of the trailer brake when the wheels of the motor or trailer were on a dirty track, due to a poor ground connection between the motor and trailer. Flat wheels are an impossibility with this brake.

Advertisements in street cars have been vindicated. A passenger of heavy build stepped off a trolley car one night and slipped on the ice, coming down with a dull thud. He was heard to mutter: "I know now why they advertise liniment so liberally in the street cars."

AN ARMATURE RACK.

A handy device in the way of an armature rack was



designed and put in use some time ago by A. D. Campbell, who has charge of the motors on the Chicago City Railway. It insures the taking out of an armature with the minimum of injury and loss of time. It is simply a box with two wooden rollers across the top, as shown in the accompanying drawings. The rollers are of course to allow of the turning of the armature. It is much superior to the method of handling armatures in some

barns, and can be copied with advantage.

MASSACHUSETTS STREET RAILWAY ASSOCIATION.

A special meeting of the Massachusetts Street Railway Association was held April 2, at Young's hotel, Boston. The principal topics of discussion were the carrying of mails on the street cars, and the sprinkling of streets. Enthusiasm was manifested in the work of the association and the meeting was the largest that has been held for some time. C. S. Clark and W. F. Pope, both of Boston, were elected secretary and treasurer, respectively. The feelings of the association in regard to the death of Albert E. Butler, were expressed in the following resolution, prepared by E. P. Shaw, C. E. Barnes and Benjamin J. Weeks, committee:

Whereas, The death of Albert E. Butler has deprived this association of the devoted services of an able and efficient official, who has unselfishly performed the duties devolving upon the office of secretary for a period of years, and

Whereas, The members of the Massachusetts Street Railway Association desire to give expression of the appreciation in which his services have been held, and of their sorrow for the loss of a friend, therefore, be it

Resolved, That this Association realizes its irreparable loss, and extends its deep sympathy to his family in their bereavement.

At the next meeting the subject of mail carrying and street sprinkling will be reported upon by special committees.

Justice Walsh, in the Adams street court, Brooklyn, fined a motorman \$50 or twenty-nine days in jail for running his car faster than ten miles an hour. He said he would impose the maximum penalty of six months in the penitentiary and \$200 fine on the next motorman brought before him on the same charge.

THE KUHLMANN COUNTERWEIGHT SYSTEM AT PROVIDENCE.

For three years a counterweight system has been in use on an electric road at Seattle, Wash., for enabling electric cars to ascend and descend steep grades with safety. This has given satisfaction, and a similar plan has been in use at Portland, Ore. The system used is the

counterweights and runs through the upper and lower conduits and around the sheaves at top and bottom. A pneumatic buffer is provided for the weights to strike against at the bottom. The device by which the cable is connected to the car is shown in Figure 2. When at the bottom of the grade and not in use, it projects very little above the slot as shown in Figure 3. When a car going up wishes to take hold, it must run slightly past

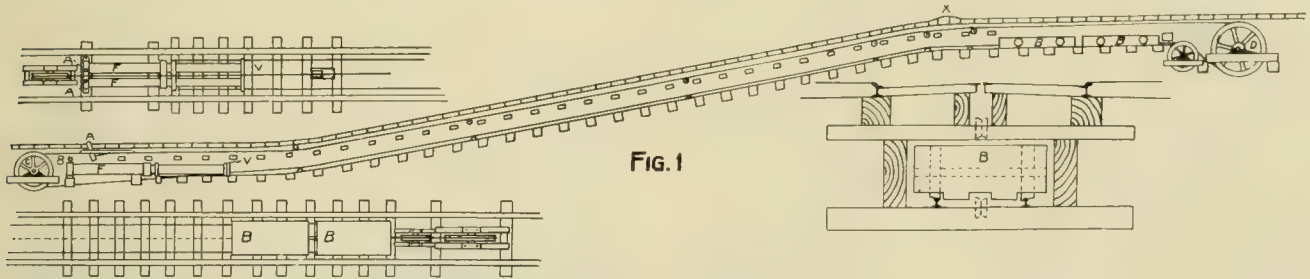


FIGURE 1.—GENERAL PLAN.

design of J. P. F. Kuhlmann, a civil engineer of San Francisco. For several months Mr. Kuhlmann has been at work adapting this plan to a grade on the Union Railroad at Providence, R. I. The grade in question has previously been operated by cable. With such a light

the connecting tongue. The conductor then raises the tongue by a lever at the side of the track as shown in Figure 4, and the car backs up until the tongue engages with the mechanism on the down hill side of the car shown in Figure 5. In the plan view of this figure, it is seen that the device is of angle irons the shape of a pointed wheel guard or fender. When the car backs up to couple on, the tongue passes in at A and is caught by D. The car can then go on up the hill with the counterweight to help it. At the top the conductor simply pulls up on the rope K, which runs to the platform on the other end, releasing the catch D, so that when the counterweights strike the buffers at the bottom of the grade,

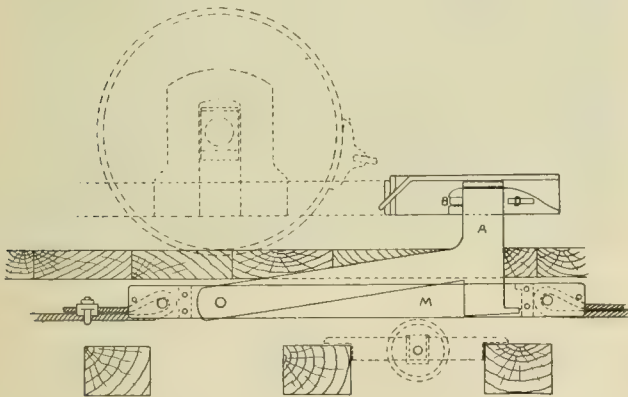


FIGURE 2.—CONNECTING TONGUE.

traffic, a cable road was an expensive luxury, but the grade was so steep (being 15 per cent in some places) that the trolley system pure and simple was not safe. The Kuhlmann system enables trolley cars to operate over grades as steep as are safe for cable lines and does away with a cable power house.

The general plan of the Kuhlmann system can be seen by reference to Figure 1. A double conduit is built under the track. The upper one into which the slot opens is large enough only for a cable and carrying pulleys. The lower one is provided with a track and is large enough for the counterweights to run through it. The cable which is practically endless, is attached to the

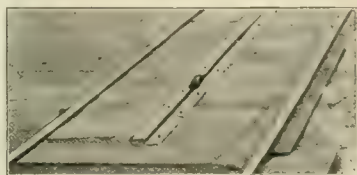


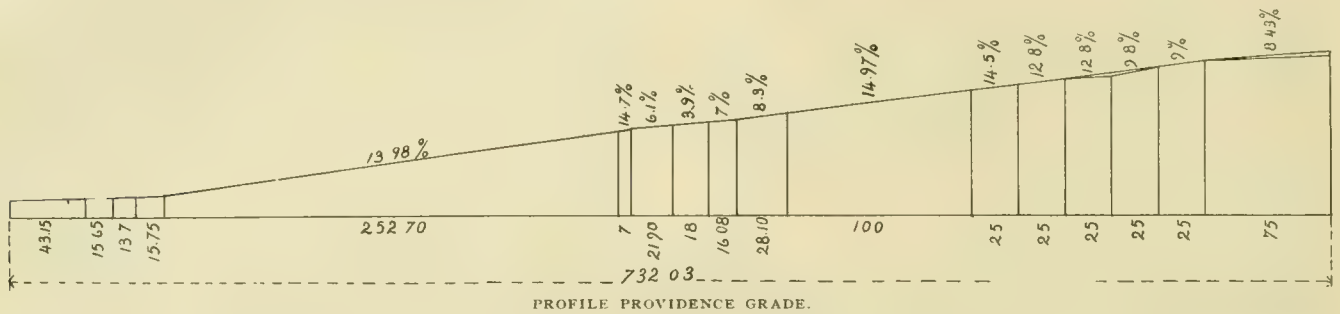
FIGURE 3.



FIGURE 4.—"HITCHING ON" AT BOTTOM.

the tongue is free to pass out of the slot A. The car does not need to stop. On the way down the car need

The present arrangement at Providence is only temporary. As said before, the grade, which is on the College



not come to a full stop, because the tongue at this point projects above the slot and can not help engaging with the car mechanism. It is therefore impossible for a car to run away down the grade, for it can not fail to connect with the counterweights before starting down. When a car arrives at the bottom the motorman pulls a platform lever, and the cam C is released by the rods E, F, and G, so that B can release the tongue. It can be seen on Figure 2, that the mechanism on the car forces the tongue A to

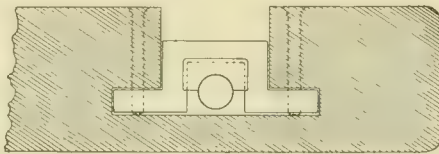


FIGURE 6.—COUNTERWEIGHT AXLE BOX.

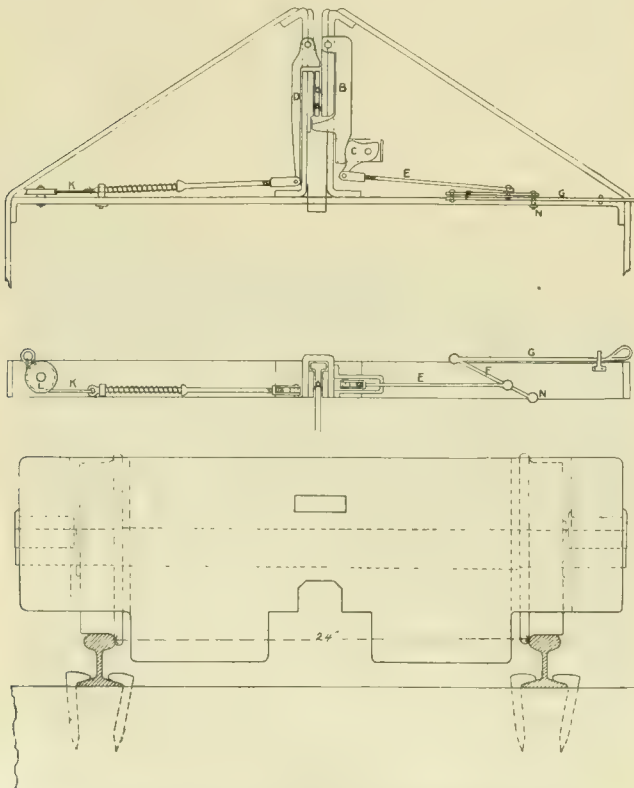


FIGURE 5.—COUNTERWEIGHT COUPLER ON CAR.

drop in case gravity does not do its work. It can therefore not catch on anything under the car.

The arrangement is very simple, and causes practically no delay. The cost of the connecting mechanism for a car is about \$16.

Hill line, was formerly operated as a part of a cable road. During the last winter a temporary conduit has been built for the counterweights, alongside one of the



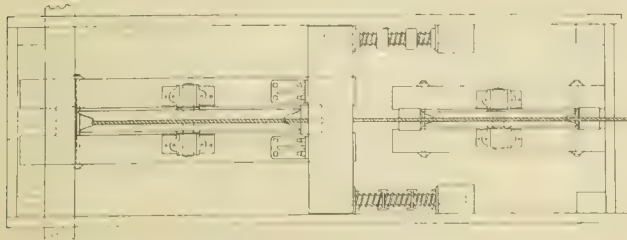
ON 15 PER CENT GRADE.

tracks, and only a single track has been used on the grade. The coming season the cable tracks will be relaid with a heavier rail and the conduits arranged as shown in Figure 1, except that iron yokes set in concrete will be used in place of wood. Both tracks are to be used, and switches placed at top and bottom, operated by the counterweights so that the cars will always take the proper track.

The grade is about 700 feet long, and the maximum about 15 per cent. Two coupled counterweights are used. One is of solid cast iron and the other is hollow, so as to be loaded to the desired amount for a good balance. Although the actual weight is less



than that of an unloaded car, the friction of the cable is such that current has to be used in going down hill.



PLAN VIEW PULLEYS AT TOP.

In going up hill good time can be made. It is a rather novel sensation to go up a hill on an electric road at nearly the maximum speed obtained on the level. A 1-inch cable is used, not because such a large one is necessary, but to inspire the confidence of a public that is used to looking at the 1½-inch rope of the cable road. Mr. Kuhlmann found from experience at Seattle, that a large rope is necessary to satisfy the public. The Providence grade has a curve about half way up, so that all can not be seen in the views shown. The counterweights are cast so that wheels can be taken out from the top. This is shown in Figure 6. The axle boxes can be slipped off the ends of the axles by raising the weights slightly and taking out two pins. When the boxes are slipped off, the wheels can be removed without further obstruction. Figure 7 shows the spring mounted sheave at the top of the grade. In putting in a system of this kind, it is of course necessary to consider the relative positions of car and counterweights on different portions of the grade. This determines to some extent the place at which the counterweight section of the road shall begin and end. It is undesirable to have a car on a heavy grade while the counterweight is on a light one. The counterweight track is built level at the top. To provide against the weights running away down hill on account of accidentally getting off this level place, a catch is put at the bottom of the grade in the slot, a few feet above the tongue to which the car hitches. The tongue can not get past this catch except when the lever raising the tongue is up.

This will be the most substantial installation of the counterweight system yet made, and it is undoubtedly a great saving over cable for light traffic on heavy grades.

The Brightwood Street Railway Company, Washington, D. C., has bought four motor cars and eight trailers from the Jackson & Sharp Company, Wilmington, Del., and four equipments from the Westinghouse Electric & Manufacturing Company. A fireproof car barn, 62 by 150 feet, with six tracks, will soon be placed under contract.

Ald. Dooem—"What's this I hear? You're goin' to retire from the council?"

Ald. Boodel—"What's the use of stayin' there any longer? There aint't any more franchises left."

AN ENGLISH COMPARISON OF CABLES AND ELECTRICITY.

It is interesting to Americans to read many of the reports which have been made during the past three years by English engineers. Of late, however, a much more accurate and practical comprehension of the facts and conditions is apparent. Leeds, England, is debating the relative merits of cable and trolley, and the city engineer in a recent report sets forth the relative advantages in a statement very nearly correct, as follows:

FOR THE CABLE.

No unsightly poles, overhead cross wires, or trolley wire along the whole length of each track.

No sparking at trolley or car wheels to frighten horses.

Less wear of metals, the load being less, and a rolling load as compared with the grinding load of the electric car.

More silent on the road, no buzzing of motors or rattle of gearing.

No danger from falling overhead wires.

A very large number of extra cars can be put upon the road to meet an emergency at a very slight increase of cost.

FOR THE ELECTRIC CARS.

The advantages of the electric overhead over the cable are:

No central slot to catch horses' shoes or bicycle wheels, and only two rails instead of three for wheels to skid against.

All power generated at the electric station is utilized, whereas by cable three-fourths of the total power generated is used in hauling the cable however few the number of cars running may be.

Electric cars may be run with varying speeds, and so make up for loss of time, but not so the cable.

Cable mode of construction involves repairs and interference with the traffic of the streets, which is not the case in the electric.

Electric cars can accommodate themselves to street traffic, whilst cable cars cannot, as their speed is regulated by the cable, and they cannot move backwards.

A broken or blocked cable stops the whole route both up and down, and the cars have to be hauled by some supplementary power off the streets, and the cable service on the route up and down is suspended until repair, which must be a considerable length of time, whereas a break in the electric wire is purely local, and as the motor cars can move either backwards or forwards, the service can be continued by using the opposite track for both traffics, or changing the cars at the point of fracture.

Less likelihood of traffic being stopped for renewing wire leads than of cables; no new wires have yet had to be fixed in Roundhay road, though they have been up three years, whereas cables have to be renewed every year, though by careful daily examination this is often done in the night.

Break power failing on a decline control, is maintained over the electric car by reversing the motor. Cable cars cannot reverse but must go with cable or run away.

Cars lit by electricity are far more comfortable and convenient for passengers.

In case of being superseded by another system the materials and work totally lost would be much less in the electric system compared with the cable system.

The electric overhead system has a greater field for improvement open to it with regard to cost than the cable system has.

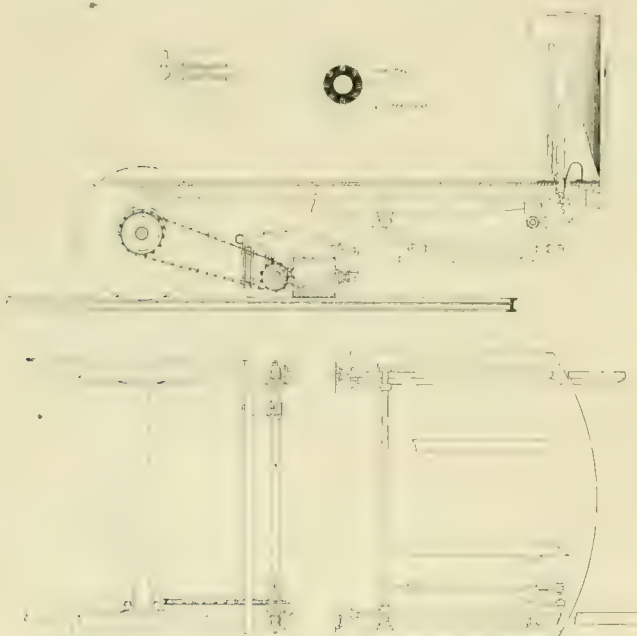
In conclusion he says:

"Comparing the advantages of the two systems, even ignoring finance, it appears, putting it broadly, that if it were not for the objectionable appearance which the poles and wires of the electric overhead system lends to the streets and the weight of the car, that system would be practically in all respects superior to the cable. In regard to the weight of the car, it is only 6¼ tons, and not 9½ tons as is generally stated, and the weight of those now being made is only five tons, whilst the weight

of the present bogie cars drawn by steam engines is $4\frac{1}{2}$ tons, thus leaving little to be complained of in this respect. As to the poles and wires, a great improvement can be made in regard to them also. All the wires running along the footpath should be laid underground and all the poles placed against the buildings, or, when the width of the streets will permit, ornamental posts carrying arc lights should be placed in their stead in the center of the roadway. With these improvements, and remembering that electric traction has a wider field for improvement than cable, I am of opinion that the electric overhead system of haulage is certainly to-day, and more certainly for the future, the cheapest and the best system for the city of Leeds."

THE BRUHNS TRACK SWEEPER.

The accompanying illustrations are of a revolving track brush that has been tried during the past winter on the Milwaukee Street Railway and has made a creditable showing. It is the invention of Henry Bruhns, of that city. As shown in the engravings, a split clutch is placed on the axle of the car, immediately against the hub of the wheel on the right side, and occupying a space of about 6 inches, thus giving ample clearance for the motor. This clutch is geared through a link belt to a sprocket wheel attached to the auxiliary shaft. This shaft revolves the brushes by means of mitre gears.



BRUHNS' TRACK SWEEPER.

When it is not required to operate the brushes, they can be raised from the track by the lever shown back of the dashboard. This lever is notched so as to enable the brushes to be raised or lowered any required degree. Adjustment for wear of brushes is provided for by vertical slots in the forging shown attached to the life guard. The bolts supporting the main bearings are passed through these slots, thus allowing them to be lowered as the brush wears. An adjustment of 3 inches is thus

obtained, allowing the brushes to wear from 14 inches, their original diameter, to a diameter of 8 inches. The brush wires are $\frac{3}{16}$ inches wide and are made U shaped to fit into grooves provided in the core of the brush. This core is of cast iron, and steel bars held by a nut at the end, are passed through the U section of wires to hold them in the core. The swinging arm supporting the brushes is machine steel with a bearing of three inches, making a substantial construction. Wearing parts are provided with grease cups. By taking the brush out and putting it in a vise, the wires can be easily renewed. This apparatus was on car 237 of the Milwaukee Street Railway during the hard February storms and did its work so well that its inventor feels that it will readily recommend itself on account of its simplicity and effectiveness. The idea is to equip about one-fifth of the cars on a system with them.

FROM A PRESS DISPATCH.

"NEW HAVEN, CONN., March 26.—J. J. Hogan, employed in the mechanical department of Yale Scientific School, has invented an apparatus by means of which the use of the motor dynamo invented by Edison is obviated. The apparatus reduces the voltage of a current without lessening the amperes. A test made to-day reduced an electric light current of 100 volts 4 amperes to 7 volts without affecting the amperes."

We have heard of many strange inventions, but this is the first time we ever heard of one for the express purpose of wasting energy. It is, however, the fault of the correspondent and not of Mr. Hogan that the invention as described would simply waste energy.

REGULATING EMPLOYMENT OF DRIVERS AND CONDUCTORS.

A bill has been introduced in the New York State Assembly providing that any railroad corporation may employ any inhabitants of the state, of the age of 21 years, not addicted to the use of intoxicating liquors, as car driver, conductor, motorman or gripman, or in any other capacity, if fit and competent therefor. All applicants for positions as motormen and gripmen on any street surface railroad in the state shall be subjected to a thorough examination by the officers of the corporation as to their habits, physical ability and intelligence. If this examination is satisfactory, the applicant shall be placed in the shop or power house, where he can be made familiar with the power and machinery he is about to control. He shall then be placed on a car with an instructor, and when the latter is satisfied as to the applicant's capability as a motorman or gripman he shall so certify to the officers of the company, and if appointed the applicant shall first serve on the lines of least travel.

The Hartford, (Conn.), Street Railway Company has ordered six Robbins fenders.

ELECTRIC CARS SAVE MORE LIVES THAN THEY TAKE.

Strange as it may seem, a Brooklyn newspaper has printed a communication which proves that more lives have been saved by electric cars in that city than have been destroyed, and in comparison with the former the proportion of the latter is so small, that it is insignificant. D. J. Lapley, a citizen of Brooklyn, says:

"For some reason the newspapers have had a good deal to say in condemnation of the trolley car and its record of 'one hundred fatal accidents' in Brooklyn. It seems to me that the case is not sized up judicially, and that most of the blame is misplaced. Nearly every fatality of this class has resulted from contributory negligence or gross carelessness, or even from suicidal purpose. The trolley has no monopoly as a source of danger. Children who are allowed to run the streets without being properly cautioned, and grown people who, from intoxication or any other cause, tempt fate recklessly, are always liable to disaster, fatal or otherwise. A larger number of people have been drowned by falling into the water from the piers, since the advent of the electric motor, than the trolley has to its credit, yet the papers have failed to harp on the deadly dock.

"The trolley, by lessening the defilement of the streets, has so ameliorated the sanitary condition of the city atmosphere that it has saved many times the number of lives it has destroyed. It has furnished a quick and comfortable transit to the outlying wards which has reduced the prevalence of grip and pneumonia among the suburban passengers more than one-half. Many can recall the winter cars, with their slush-soaked straw and foul odors, and the tiresome and dangerous delays in the snow, when the passengers were forced to walk in the storm, or even to assist the wretched horses by pushing. Many a man has gone down to his grave from a cold contracted on such a trip. The trolley has saved thousands of lives by enabling the mechanic and clerk to move their little ones from the unwholesome tenements of the city to the pure air and sunshine of the country. It has added, in dozens of ways, to the sum of human welfare. Why, then, does the press persistently attack a system which accomplishes so much good that it has become a great public necessity?"

Mr. Lapley's argument is just and should silence those detractors of the system who persistently find fault.

W. A. Smethurst, formerly with Pepper & Register, and Rodney D. Allen, of the Philadelphia Traction Company, have formed the firm of Smethurst & Allen, with offices in the Betz Building, Philadelphia. That they are in business as electrical engineers and contractors, is shown by these contracts. They are building the first section of the Philadelphia & New York Traction Company, 7 miles from Bound Brook to Raritan, and 4 miles of the Seashore Traction Company from Asbury Park to Long Branch.

GOOD BYE, GRAND PACIFIC!

It looks desolate around the Grand Pacific hotel, which for twenty-five years has been a scene of activity, as it has been a sort of headquarters for men in all kinds of business, and especially all varieties of railroad interests. There was a sort of hospitable air about the Grand Pacific, which was lacking about all the other Chicago hotels. The cause of the abandonment of the Grand Pacific is a greedy landlord, who wanted more money, and will probably discover that he will have a vacant building on his hands. John B. Drake and Sam Parker, the proprietors, will rest until fall, when they will probably open up another hotel. Paul Gores, for thirteen years behind the desk, will extend his customary welcome to his old friends, and endeavor to make them feel as much at home at the Auditorium Annex as he did in the Grand Pacific. Charles Morton, who has made out bills for eight years at the Grand Pacific, will be glad to do the same thing again for any of his friends who may like to see him, at the Great Northern. Ever since it has been published the REVIEW could be found hanging on the office partition, when not being consulted, and was the only publication permitted. There was a great scramble for souvenirs when it was known that the hotel would be closed, and everybody was feeling pretty sad the last day.

A story is told of a man who was assigned a west room by Mr. Gores. Next day he asked to have it changed so the sun would wake him in the morning. "All right," said Mr. Gores, "you can have 214."

"How far is that from my old room?" asked the guest.

"About three blocks," was Mr. Gores' reply.

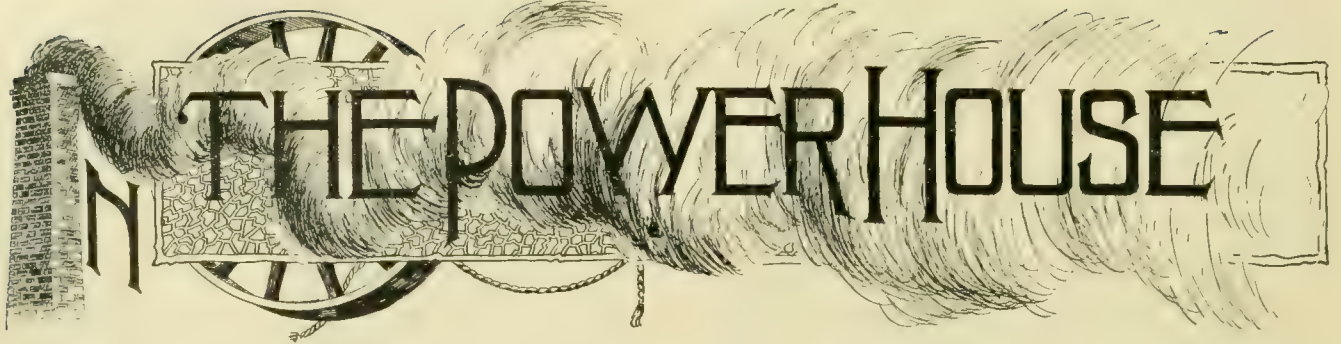
And it was. The guest walked from Quincy to Jackson street on the La Salle street side, a block from La Salle to Clark on the Jackson street side, and from Jackson to Quincy on the Clark street side to his room, with north and east windows at Quincy and Clark streets.

Good bye, Grand Pacific! May you soon have as homelike and hospitable a successor!

VICTIMS OF A MAYOR'S SPITE.

J. L. Wilcutt, secretary, and E. P. Vining, general manager of the Market Street Railroad Company, San Francisco, were arrested April 6, charged with misdemeanor in tearing up a street without notifying the supervisors. Mayor Sutro swore out the warrants, and it looks very much as if it was a piece of spite work on the part of the mayor who has been fighting the Market Street Railroad for years. The mayor has also been enjoying a taste of municipal interference. He secured a franchise for an electric line, agreeing to use California rails and machinery, but made his contracts with eastern parties. When he asked for an extension of time, he was hauled over the coals.

The Butler Manufacturing Company, 146 South Clinton street, Chicago, is in the hands of the sheriff.



This department is devoted to the construction and operation of electric railway power houses. Correspondence from practical men is specially invited. Both the users and makers of power house appliances, are expected to give their views and experiences on subjects within the range of the department.

If a power house is to be built nearly incombustible, why not spend a little more money, make it absolutely fireproof, and do away with insurance bills entirely? If a power house is built so that it is impossible for a fire to start in it, insurance is a needless expense, unless the risk to walls from surrounding property is very great. If the standard power house specified by the underwriters as entitled to the lowest rate, is constructed, there is no possibility of a fire spreading in the building, consequently no use in carrying insurance. It is getting to be a far too common practice to build a power plant which is very nearly fireproof, but which lacks one or two features which would make it entirely so. A perfectly fireproof station is not an expensive luxury, even for a small road. The idea of doing away with insurance in this way is rapidly growing.

* * *

If a power house designer and engineer were to go over the country looking for examples of poor engineering in power station design, he would, on his return, probably have more to say about the arrangement of piping than any other single item. To be sure there are some cranks on the piping question that would design the piping first and arrange the station afterward, but they are few. By far the greater number will ignore the piping until they have arranged everything else. Economy in real estate sometimes necessitates a greater length of piping than would be necessary if the designer could have exactly the arrangement of engines and boilers he desires. In such cases one has simply to make the best of adverse circumstances. But there is no sense in sandwiching in apparatus of any kind between engines and boilers when it could as well have been put in some other place. Piping should be as straight, short and simple, as possible. Turns and complications cost money to install, waste energy in daily operation, and make repairs difficult. The drop in pressure in a badly designed piping system, is not generally appreciated. In a station of one of the largest electric railway systems in the west, an efficiency test made two years ago, showed a drop of ten per cent in pressure between boilers and

engines. If the whole truth were known there would probably be many more cases of this kind. A company having a "skeleton" like this in its power house is not particular about having the fact get out.

* * *

The Feed Water Heater Manufacturers Association at their meeting in January, 1895, entered into an agreement as to the nominal rating of feed water heaters, that is most commendable. Heaters sold by members of this association will be rated according to the square feet of heating surface. The term horse-power as applied to a feed water heater means nothing, unless it is accompanied with a long definition as to what horse-power means, as applied to the particular heater in question. Such indefiniteness benefits no one, except the dishonest maker who gives his heaters a big nominal rating for the sake of deceiving his customers in making a sale. If makers of other appliances could agree on standard ratings, it would be a great benefit to the entire trade. The resolutions of the feed water heater men are as follows:

We, certain manufacturers of closed feed water heaters, in convention assembled declaring

That a better understanding among ourselves and also between each of us and our customers in the matter of rating of feed water heaters is much to be desired, do hereby Resolve:

That we believe that the only proper rating for feed water heaters is one which is based upon the square feet of heating surface contained in the heater. For the purpose of giving practical shape to this belief, we do further Resolve:

That we hereby agree that for the future we will in each and every case in which we are called upon to make prices upon heaters, state the exact number of square feet of surface which we are offering; to give further effect to this action, we Resolve:

That we will in each and every case, state without reservation, both in our printed catalogues and in our specifications, the diameter of the tubes, the number of lineal feet thereof, and the total square feet of heating surface in each heater offered.

Resolved further, that the Secretary be requested to transmit a copy of these resolutions to every manufacturer of closed heaters in the United States.

And we hereby agree to live up to the spirit and the letter of the foregoing and to bind ourselves so to do by our signatures affixed below.

Resolved finally, that the Secretary be requested to invite all closed heater manufacturers of the United States to join this association, and to subscribe to the foregoing resolutions.

The makers agreeing to this rating are those manufacturing the Goubert, the National, the Wetherill, the Keystone, the Baragwanath, the Berryman and the Wainwright feed water heaters.

* * *

The use of a boiler compound, without regard to the quantity that should be used with the water employed or a knowledge of the analysis of the water, is very much

like employing a quack doctor. The patient runs about an even chance of being killed or cured. The writer has been in steam plants where a compound was used which was suited to the water, but only about one-tenth enough was used to accomplish the purpose. How much good it did to take the trouble to feed that boiler its daily dose of compound for the sake of preventing ten per cent of the enormous quantity of scale that was continually forming, can be imagined by our readers. There is, however, one simple home remedy that is very popular with some engineers and very unpopular with others. We refer to kerosene. Probably the secret of some of its unpopularity is the habit it has of finding out all leaks which would otherwise be plugged up with scale and dirt. Kerosene is worthless unless it is applied in the right way and at the right times. Its value as a scale remover and preventive is caused by its tendency to crawl in next to the boiler plates wherever it has a chance. If the inside of the boiler is coated over with kerosene, it will work its way under the scale. The point is not simply to get the kerosene into the boiler, but to coat over the interior. To do this, it must be put in when the boiler is empty. Then, as the boiler is filled, the kerosene covers the surface of the water and leaves a thin coating on the sides and flues as the water rises. Some engineers advocate swabbing over the inside with kerosene before the water is turned in. It goes without saying, that it is not desirable to have candles or torches near the boiler during this operation. In regular running, the kerosene is fed in small quantities with the feed water.

* * *

A street railway contemporary questions, editorially, the desirability of direct connection for units of small size in railway plants. The main objection raised by it is that the shocks to the engine, and especially the cylinder, of a direct connected unit in a small power plant are such that they are liable to break the engine. We have yet to learn of trouble from this, or any other source, with a direct connected unit, unless it was of manifestly bad design. We fail to see how it is possible for an engine cylinder or piston to undergo any greater strain under a sudden overload than when working on steady load. Water cannot rise higher than its source, and it is impossible to have more pressure in the engine cylinder than in the boiler from which it gets its supply, as long as the valves are in a condition to keep the engine up to speed on a load. It is impossible, therefore, with dry steam, to have a greater shock or strain put on the cylinder head and piston than occurs regularly twice each revolution when the engine is working under a heavy load. The main strain of a short circuit comes on the flywheel crank and shaft. It certainly ought to be possible and practicable to build these parts strong enough for the work. In fact, it undoubtedly is possible, for it is being done every day. The question of direct connection resolves itself simply into that of the first cost of a direct connected unit. Small units of this kind cost much more as compared to belt driven machines than do those of large size.

The saving in real estate in a large station is also more important than in a small one. The first cost is, therefore, decidedly in favor of belt drive in small stations. Whether this high first cost is balanced by advantages of economy and reliability in operation is the question to be decided in putting in a small station. As a rule, belts are more troublesome in small stations than in large. Not only will a small belt give more trouble than a large one from slipping and coming off, but the greater variation of load in a small station aggravates the difficulty. Any one who has had practical experience in operating small stations appreciates the truth of this. It may be argued that a belt of the right size to do the work ought not to give trouble, but the fact is that a great many of the belts working on small generators do give trouble on full load. As long as a belt is working on a violently varying load it will slip, and such slipping does not improve that belt's condition. It is nothing uncommon to go into a station running small belt driven generators, and find a much greater capacity of machinery running than is necessary from an electrical standpoint, simply because the belts give trouble on a heavy load. In view of the much more substantial and reliable character of direct connection, as well as its lower maintenance account and greater efficiency as compared with belt transmission, we expect to see it come into use in smaller and smaller stations year by year. The engineers who actually operate railway stations will hail the advent of direct connection.

* * *

Use of Manning Boilers in the West.

BY C. C. UPHAM, MANAGER LINCOLN STREET RAILWAY.

In the March number of the REVIEW, under "In the Power House," you state that there seems to be a prejudice existing against the use of vertical fire tube boilers of the Manning type in the west, and that it is hard to assign any good reason for this prejudice. There are several reasons for this seeming prejudice:

First. The coal used is exclusively bituminous. This coal rapidly fills up the flues with soot, and necessitates the cleaning of them at least once a day while the boiler is in use. A man cannot stand over the upper end of a vertical boiler and use a flue cleaner while hot gases are escaping through the flues. It is therefore necessary to blow out the flues with a steam jet, which is not so satisfactory, and is more expensive, because steam hose costs money.

Second. In many western waters there is a great deal of lime and magnesia (from 30 to 50 grains to a gallon in some localities), [and 50 to 150 in some others within 400 miles of Chicago.—Ed.] This rapidly forms scale, and even with the use of compounds the tendency to scale is very troublesome. A vertical boiler with a flat crown-sheet, and having 150 to 180 flues, is a complicated structure from which to remove scale when once it is formed. As the scale loosens from the flues it drops down and lodges in little heaps at the base of the flue, where the heat is greatest. This heap of scale prevents the water from coming in contact with the iron of the

flue and crown sheet, and the result is, leaks and a repair bill. It is extremely hard to remove this loosened scale, because with such a forest of flues it is impossible to get a jet of water in among the innermost flues.

Third. The bottoms of the flues at a point near the fire door, in a boiler which has no extension front or brick arch, are subjected to a change of temperature every time the door is opened. This produces leaks again, as well as destruction to the crown sheet, and crown sheets are expensive to renew.

Fourth. Vertical boilers in use when bad water exists give more trouble from foaming than horizontal boilers. There is a greater upward rush of water and steam following the flues. This, together with the comparatively small releasing surface for the steam, causes great agitation at the surface of the water. As a result, considerable quantities of water are sometimes carried over with the steam. This is more noticeable in street railway work, on account of the sudden demands by the engines for large quantities of steam.

Fifth. A record of a large number of tests of two boilers of same capacity—one Manning type and the other return flue horizontal—running side by side, under exactly the same conditions and fired by the same man, shows an evaporation of 8 per cent greater in the horizontal boiler; and good water tube boilers would probably have done better. And that 8 per cent saving in fuel would buy a new boiler or set of boilers every four or five years.

This sectional prejudice has some foundation, and probably exists to a greater or less extent wherever a low grade of coal and poor water are in combination.

* * *

• Book Keeping in the Power House, or Some Things the Clerk Could Not Understand.

The clerk in the company office came down to visit the power plant one afternoon. He was a good clerk and fully understood book keeping and all that sort of thing, but he had not been in the electric railway business very long and did not know very much about the way power plants are (sometimes) run. He went down to learn, and especially to find out all he could about the way they kept the records of the station, or, as he would call it, "kept the books." He had been at work since he came into the company's employ, at the office of the secretary and treasurer. He had counted the money turned in by conductors, and looked over trip sheets until he thought that he thoroughly understood that part of the business. He had paid bills for the power house coal and supplies, and also the wages, and he wondered where all the rest of the power house book keeping was done. He had an idea, although he did not know much about steam or electricity, that it was just as necessary to keep a record of, and check up, the output of the apparatus around the station, as it was to keep tab on conductors. Accordingly, he went down to the power house loaded to the muzzle with questions as to the way books were kept at the power house. Well, he nearly

drove the engineer crazy. Wanted to know how much coal it took to run a car a mile. Engineer could not tell him. Never kept any record of coal. General office always paid the bills; they ought to know. Clerk wanted to know how they told when the machinery was dishonest and got to knocking down fares and eating into the company's coal pile. How did this station compare with others, anyway? Engineer thought it was a purty good little plant. Never had no trouble to speak on. Was not afraid to put it up against any plant in the state, but never made no tests or kept any records. It was too much bother to be always fooling with a lot of figures. The company had an indicator somewhere. The engineer that built the plant told them they ought to have it, but it got busted some way and had never been fixed. Wasn't any need of bothering to put that thing on every little while. Then the clerk got curious as to the horsepower of the engines and dynamos and the horse-power required per car. This got the engineer into more hot water, for as soon as the clerk found out the horse-power necessary to operate a car, he wanted to know why so much machinery was being run. The engineer moved around uneasily and explained that the plant always ran so much smoother and easier when plenty of engines were running, (especially as the valves leaked so that they could not pull their rated load). Finally the clerk went off and the engineer felt relieved. He never likes to be bothered with this nonsense about keeping records. Let them do all that at the office, he says. Nevertheless, that clerk is still wondering why it would not pay to keep records of things in the power house, just as in other lines of business. He does not see why an engine, or boiler, or dynamo can not be dishonest as well as a conductor.

JOHN D. KILGORE'S NEW ROADS.

An electric railway from Steubenville to New Philadelphia, Ohio, has been projected by John D. Kilgore of Wintersville. The road would reach five railways and pass through the villages of Wintersville, Richmond, East Springfield, Amsterdam, Kilgore, Lamartine and Sherrodsville; and through fine farming districts. The proposed electric line would fill a long felt want in that populous district, and probably would be a paying enterprise from the start.

The Jersey City, Hoboken & Rutherford Electric Railway on April 1, opened the Rutherford terminus to traffic.

A grade crossing bill has been vetoed by Governor Stone, of Missouri, on the ground that one of its sections constituted the steam railway companies judge and jury toward the street railways. The bill also provided, which was all right, that in case trolley wires were not placed 20 feet above the tracks the steam railroad company could cut the wires and tear up the rails of the street railways.

RULES AND DISCIPLINE OF STREET RAILWAYS.

BY H. S. COOPER, GENERAL MANAGER SCHENECTADY STREET RAILWAY COMPANY.

INTRODUCTION.

Possibly no one thing in the operation of street railways, especially in the transportation department, has so large a bearing on their financial success as has the perfection of the rules for and discipline of the employes; "discipline" being the observance of the rules of the employer, and perfect discipline being their prompt, exact and continual observance. Maximum efficiency of operation, which includes not only maximum receipts, but also minimum expenses, can only be attained when perfect rules are supplemented by their perfect observance. Good discipline will atone for many imperfections in service and equipment, but neither good service nor equipment can atone for poor discipline, as they cannot exist with it. Directly, the character of the rules and of their observance will affect the profits as they affect the income; indirectly, they will affect the profits through the expenses; not only the ordinary ones of "wear and tear," but the extraordinary ones of accidents and casualties. As nothing of human origin is perfect, accidents are one of the things to which street railways will always be liable, but with proper rules and discipline they are one of the things for which they should not always be liable. The time is coming when the results of the wanton carelessness or criminal negligence of an irresponsible employe will not be vicariously visited on an employer which has taken every means within its power to avoid such results. As matters are now, an employer may at great expense have provided every material safeguard compatible with a sufficient service; have selected its employes with care; have formed a perfect set of rules, instructed its employes therein, and seen that the rules were thoroughly enforced; and even then, by the wilful or negligent violation of these rules by an employe, the employer may be subjected to ruinous losses or damages.

There is, however, a growing tendency upon the part of both the public and the courts to favorably recognize the efforts made by the employer on behalf of efficiency and security, and to visit the penalty upon the actual author of the trouble—the employe—whenever it is known or shown that the employer has done everything humanly possible to prevent such trouble. It therefore behooves the employer to recognize this growing tendency by being more than ordinarily careful as to the perfection of the rules and their observance and enforcement. Good rules and good discipline are not only dividend earners, they are dividend savers. They are the abstract safety appliances, as fenders, brakes, gongs and signals are the concrete ones, and as the public and the courts now exonerate for the use of the latter, so will they, later on, exonerate for the observance of the former. As the foundation of the "discipline" is the

"rules," it will be necessary, first, to consider them fully; their definitions, qualifications, formation and composition, classification and arrangement, publication and promulgation. After that will come the consideration of the proper methods of explaining and teaching them, of obtaining, maintaining and rewarding their observance, and of preventing, obviating and punishing their violation, the whole constituting the "discipline."

RULES.

Definitions. By the term "rules" is meant, not only the published "Rules and Regulations," properly so called, but also the usages, the various "orders" and the "directions," "instructions," "notices," "bulletins," etc. Placed in their natural order and defined, they will be as follows:

1. Usages are the unwritten laws of discipline—the axioms of service—and consist of those rights, privileges, customs, duties, actions, relations and limitations, which have been found by long experience to be proper and generally applicable to all street railways, or especially applicable to all street railways running under like conditions. They are supposed to be so obvious, well understood and universally accepted, as not to need formal publication, and they will not, therefore, be considered any further.

2. Rules, general and special, are the fixed and formal regulations which define and classify the duties and limitations of all employes under general conditions. They are "general" when applying to all employes or to all employes in one department or class. They are "special" when applying to certain departments or classes, to special employes, special duties or special conditions.

3. Orders are temporary "rules," called forth by unforeseen or accidental circumstances or conditions, and limited in time or scope by them. Should the circumstances or conditions become fixed, the order will become a rule. Orders are "general" or "special" in the same manner as are the rules.

4. Instructions are specific directions for the correct performance of certain duties, or are explanations of the manner of performing certain operations. They are neither rules nor orders, but may be enforced by one or the other.

5. Notices or bulletins are published communications for the purpose of giving general or special information, etc., such as calling attention to, explaining or defining existing rules, orders, etc.; and for the publication or promulgation of schedules, assignments, etc. They also include forms that might be called "proclamations," such as dismissals, appointments, the changing, amending or nullifying of rules or orders; the fixing of rates of wages, hours of labor, etc.

These five divisions embrace the whole range of formal and public communications to employes in connection with discipline, and so closely define them that all such communications can, in practice, be classed under one or the other of these heads.

Nothing has been or will be said in regard to verbal

rules or orders; of these the less the better for discipline. They are not necessary in any well managed street railway; their use only tends towards the inexactness, the misunderstandings and mistakes, and the consequent disputes which are subversive of discipline.

QUALIFICATIONS.

Individually as classes, as well as collectively as a whole, the disciplinary forms and communications should be comprehensive, exact, plain, succinct, reasonable and equitable; having a natural correlation and sequence and forming a complete and harmonious whole. No full and proper observance can be expected if any of these qualities are lacking. If they fail to provide for all known and knowable contingencies; if they are loose or inexact in their specifications or limitations; if they are diffuse, verbose or equivocal in their language; if their requirements are unreasonable or unjust, or if they are contradictory within themselves or with one another, they will be difficult to enforce in proportion as they are thus defective. Therefore in their formation and composition they should be:

1st. Comprehensive. Collectively, it is necessary that they not only cover all existing circumstances and conditions, but it is necessary also that they cover all circumstances likely to occur under any probable change of conditions. Individually, they should be complete as regards their subject, covering it in all its bearings and details.

2nd. Exact and specific in their requirements and limitations, avoiding ambiguity in meaning, using always the same term for the same object, defining where definition is necessary, and giving illustration where illustration is needed, leaving nothing to guesswork, and giving no opening for misunderstandings and mistakes.

3rd. Clear, plain and succinct, saying what is to be said in as few and simple words as will fully cover the subject, avoiding useless repetitions, pedantic words or slang phrases. A rule or order or notice that is couched in plain, terse, pointed language, will convey the idea quicker and remain in the memory longer than one that is diffuse and verbose.

4th. Reasonable in their requirements; not asking impossibilities, nor even making the duties or limitations so onerous as to be prohibitive—employees are men, not angels!

5th. Equitable; not only as between the employer and the employed, but as between the employees also, no matter how different their positions.

Beyond and between these cardinal points are others that should be specifically borne in mind in both the formation and composition, especially of the rules.

Threats of penalties should never be used in any way or at any time. To say, "The infraction of this rule will be severely punished," is puerile and virtually means nothing; it is simply a "bug-a-boo."

Penalties should never be incorporated in a rule. In a few cases, where they are specific and absolute, as for drunkenness on duty, or positive refusal to obey orders,

they may be added to the rule as a corollary, but in general it is best to leave out all penalties and to let example and not precept show them. This, of course, does not apply to cases where there is indemnification for loss or damage occasioned by violation of the rules, etc.; that is a reparation and not a penalty. The phrase "no excuse will be received for," &c., should never be used, for if it is used, the chances are that sooner or later the statement will have to be discredited or injustice be done—two horns of a very nasty dilemma.

The use of "must" and "shall," should be avoided as much as possible, so that when they are used they will stand out prominently and tend to emphasize the implicit and exact fulfillment required of some important rule or order. "Will" answers all requirements and makes the employe a party to the rule.

The "third person" should be used in all communications to employes, except personal ones to individuals. This tends to make all the communications more formal and more impersonal, addressing, as it does, the class or department instead of the individual.

Rules, orders, &c., should not be made too numerous, as such tends to bewilder and confuse. A rule, order or notice should embrace one subject, and, if possible, complete it. If the subject is one that requires several heads or divisions, it is better to paragraph them (sub-numbering, if desired), under one rule or order, than to split them up into as many rules, orders, etc. Again, if any additional rule, order, notice, etc., is necessary in regard to a subject, it is always better to incorporate the old one into the new, or vice versa, than to make it an additional one.

Petty, frivolous or unnecessary rules or orders, should never be made. They tend to lower the self-respect of those to whom they are addressed, to cast ridicule on those by whom they were issued, and to distract from the important rules or orders.

Usage should not be incorporated nor made into a rule except negatively, i. e., into one where their practice is forbidden.

As a whole, the tone of all disciplinary communications should be formal and positive, but as dealing with self-respecting individuals. The spirit should be: that they will be obeyed, not grudgingly and because a penalty will follow every violation, but cheerfully and conscientiously, because they are right, just and equitable, and because such obedience will result in mutual benefit to both employer and employed.

CLASSIFICATION AND ARRANGEMENT.

The orders, notices, directions and bulletins being issued irregularly and on very diverse subjects, admit of no classification within themselves beyond what has already been given, neither can they be subject to any special arrangement. The "rules," however, being issued as a whole, can and should be properly classified and arranged. While this is not as vital a matter as is the proper formation and composition, it still adds materially to their effectiveness if they are grouped or class-

ified so as to permit of their being added to or sub-divided without confusion; and if they are so arranged as to facilitate their reference and memorization. A mass of rules, incongruously jumbled together and without relation or sequence, will not permit of as ready reference, and are not as conducive to as clear an understanding and as ready a remembrance as they would be, were they grouped under proper heads and clearly divided and arranged according to their natural relation.

Three methods of grouping are possible, the first with regard to the duties only, the second with regard to the employes only, and the third, a combination of the two. This last gives the best results in practice, is the one most generally in use and will be the only one considered. Under it the classification would be as follows:

- 1st. General Rules, applicable to all employes, to all classes of employes and to all departments.
- 2nd. Special Rules, applicable to certain classes of employes or certain groups of departments.
- 3rd. General Rules, applicable to only one department or class of employes.
- 4th. Special Rules, applicable to special employes, or to a special duty of certain employes.

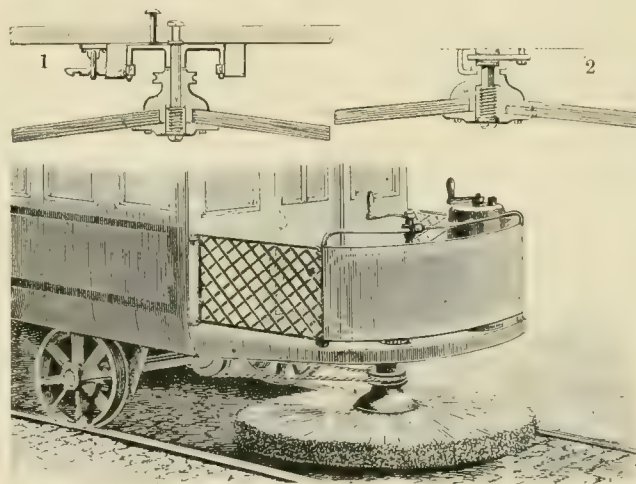
This general grouping is suitable to roads of all sizes and kinds. In a small road, even where the number of employes or the duties to be performed by them are not sufficient to allow of fully departmentizing, the above grouping will not be found too cumbersome. With larger roads, no matter how complex their organization, the method admits of infinite expansion and division without deviation from the original plan. Under such a grouping, a new employe would first have to become conversant with the general rules governing all employes, and which show the general duties, rights, privileges and limitations between himself, regarded simply as one of the employes, and the employer; and also the relations between himself and all other employes. He would next have to learn those specifically governing him as one member of a department or class which had been grouped with other departments or classes and governed by special rules, as a group. He would then come to the general rules of his own particular department or class, and finally, to the special rules, specifically governing him individually, as one of its members.

The arrangement of the rules under each such general group, should be a natural one, placing as first, the first rule necessary to be learned, and following with the others in such succession as would result were the new employe to learn each new rule only as he met the duties, &c., that were covered by it. An adherence to these lines will facilitate reference to and remembrance of the rules. This is, of course, on the supposition that every employe who is fit to be intrusted with a knowledge or possession of any of the rules, is fit to be intrusted with them as a whole. Nothing is gained by keeping away, or appearing to keep away, from any department or class of employes, a knowledge of the rules governing any of the others. This is virtually done when the rules for each department are published

separately and issued only to the employes of each such department. The suggested secrecy of this method has nothing whatever to commend it, the while it necessitates the repetition in every "set" of rules, of the "general" and special rules applicable to all other departments. As a matter of economy it is questionable; as a matter of policy it is vicious, and as a matter of efficiency it is very poor. It is much better to have every employe fully conversant with all the rules of the employer, in fact, such a general knowledge should have at least the approval of the employer, and this approval is best manifested by the issuing of the rules complete to every employe, with the possible exception of common laborers.

NEW FENDERS EVERY DAY.

Seven car fender patents a week is the average issued by the patent office, yet there is room for more. If a possible victim had his choice, he would no doubt prefer to take his chances under the wheels than to be struck by some of the many types of fenders on the market. In Brooklyn, some wag has advocated the adoption of a device reversing the process used in the railway mail service of taking a mail bag into a car from a post when



ODD STYLE OF FENDER.

the train is going at full speed, so that by means of a scoop net, with spring board attachment, the victim will be thrown in the air and caught by a hook on wooden arms erected along side the track.

One of the latest fenders is shown. It is a brush revolved by gear connection on the car axle, or it can be run by a separate motor, if desired; this economical arrangement is particularly recommended for electric cars. Fig. 1 shows the device revolved from the axle, and Fig. 2 shows the brush arranged for a separate motor, a vertical shaft being replaced by one rotated by the motor. The fender runs, normally, a short distance above the track, but can be brought in contact with it, and when not "fending" can be used to remove snow and ice, if there be any. The victim will have to be struck just right or he is in danger of being thrown under the wheels.

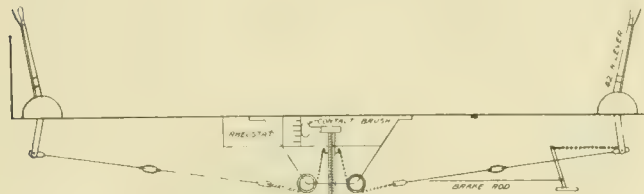
THE MONROE COMBINATION BRAKE AND CONTROLLER.

A combination brake and controller, invented by M. B. Monroe, has been experimented with, recently, at



BRAKE AND CONTROLLER.

New Orleans. The brake and contact arm of the rheostat are both connected to a lever on the front platform. The lever is fitted with a ratchet. Three notches on the ratchet are devoted to the rheostat and four to braking. A forward motion of the lever releases the brake and turns on the current. A backward motion shuts off current and applies brakes. To work the rheostat a chain is connected to a rod from the lever. This chain passes under a pulley and works the plunger and spring carrying the contact brush. The brake leverage, manifestly, can not



DETAIL OF BRAKE AND CONTROLLER.

be very high with this arrangement, and in its present form it is not applicable to series-parallel control. These points might, however, be provided for without sacrificing the main principle.

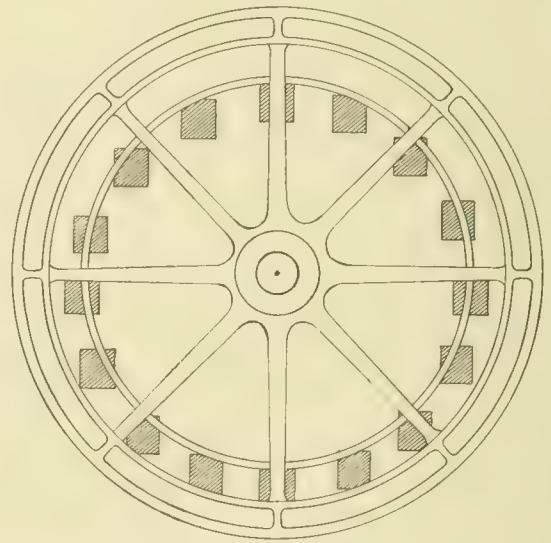
WANTS \$5,000 FOR HER CHICKEN'S WOUNDED FEELINGS.

Jennie C. Murphy thinks \$5,000 of street railway money in her pocket would soothe her chicken's wounded feelings. Her declaration sets forth that on her way home from market she hailed a car, using as a hailing sign a live young chicken, which was in her lap when she paid her fare. Afterward the conductor told her the chicken could not ride in the car, and it was a case of chicken get off or she and the chicken together. She refused to comply as she was afraid the fowl would freeze, but was put off by the conductor. She alleges that "at no time did the chicken conduct itself in a manner different from that quiet manner of which the conductor was aware at the time he collected plaintiff's fare."

George W. Pack has been elected president of the Detroit Railway. S. R. Break is superintendent.

DESIGNED TO PRODUCE REVENUE.

Seaside resorts and street railways with parks may find something of interest in the invention of William D. Cronin, Philadelphia. It is a combination of trolley railway and observation car, and consists of a double wheel, about forty feet in diameter, of wrought steel, shown in



CRONIN WHEEL.

the illustration. Instead of a stationary axle, the axle comes in contact with a trolley wire, from which the motive power is furnished. The wheel, from which are hung twenty-two coaches, with a capacity of 200 passengers, runs on its own rim upon a 16-foot gage track in a circle, figure 8, or ellipse.

IRISH EMPLOYE'S BENEVOLENT SOCIETY.

Not only in the United States are the employees of street railways organized into benevolent societies. The first annual meeting of the Dublin United Tramways' Employees' Benefit Society and Provident Fund has just been held. The cost of sick relief, etc., to 119 members was a little over 50 per cent of the gross income, and a dividend was declared. The company started with \$1,200 from the Tramway company, which made a subscription of \$1,000, this year. The gross income was \$3,965. The original membership was 568, new members 28, deaths 7, resignations 40, on account of leaving company's employ, leaving 544 members. Relief was given to 27 drivers, 27 conductors, 47 horsekeepers, 9 road department, 11 car repairs department, 1 foreman, and mortality allowances to 7 members and wives of 2 members.

Pile driving with dynamite has been tried with success at Budapest, Austria. On the wrought iron cap on top of a pile was placed a cake of the explosive, six inches in diameter, and three-fourths inch thick. It was covered with clay and ignited. Each explosion was said to be equivalent to five blows from a 1,500-pound monkey, falling ten feet.

STREET RAILWAY LAW.

EDITED BY FRANK HUMBOLDT CLARK, ATTORNEY AT LAW, CHICAGO.

Railroad in Street, Carrying Freight as well as Passengers.

A railroad operated in a city street imposes no greater burden on the soil and gives no greater right to abutting property owners by carrying freight than by carrying passengers only.

The court said: A "street railway" has been defined as "a railway laid down upon roads or streets for the purpose of carrying passengers." Elliott, St. R. Rs. 557. It is further said by the same author that "the distinctive and essential feature of a street railway, considered in relation to other railroads, is that it is a railway for the transportation of passengers, and not of freight." It is said to exclude the idea of the carriage of freight, and that a railroad over which heavily laden freight trains are drawn cannot be considered a street railway. Street cars are little more than carriages for transportation of passengers, propelled over fixed tracks, to which their wheels are adapted, and as a convenient, comfortable, and economical mode of conveyance, their use has become well-nigh universal in cities, and as they add, when properly constructed, little or nothing to the burdens of the servient tenement, their use is upheld without the necessity of compensation to the abutting owner. The use of a public street, however, for an ordinary railway for the transportation of freight and passengers, it has been said by the highest authority, imposes a new burden upon the street, not contemplated in its dedication, and therefore the user cannot be indulged without compensation to the abutting owner of property upon such public street. We are at a loss for any good reason for this distinction, or to see why the transportation of freight by modern and improved methods is not equally entitled to encouragement with the transportation of passengers. The essential wants of the citizen demand the former equally with the latter. If there is any difference in the burden imposed upon the street, it is in degree and not in kind. The great highways of England were constructed, not so much for the convenience of passengers as for the transportation of freight. In the infancy of commerce, when trade and traffic by land was insignificant in volume, when the sumpter horse, which answered to our modern pack mule, answered all the purposes of transportation for goods, footpaths, bridlepaths and lanes served all needed purposes; but with the growth of inland commerce, and the need of greater facilities for the interchange of commodities, the use of wheeled vehicles, and, as a means thereto, the highway, as we know it, became a necessity. The Appian Way, commenced 312 B. C., which has provoked the admiration of the world, was entitled to commendation for its roadway sixteen feet in width, constructed for the transportation of burdens, while the paths of eight feet on each side of it for foot passengers, and upon which the Roman legions were wont to march,

were unpaved. In the construction of modern highways, urban and suburban, the great difficulty and the prominent object has been to build and adapt them, by grade, width, and structure of roadbed, to the carriage of freight. Yet we are told in effect that, so far as modern methods are concerned—so far as ease, speed and economy are involved—improvements are to be limited to the transportation of passengers; that cars with wheels adjusted to move upon fixed tracks, when applied to the transportation of passengers, are within the contemplated objects in view in opening a road or street, and therefore add nothing material to the burden of the servitude of the abutting landowner, while a precisely similar structure, adapted to the transportation of freight, adds an additional burden, of a different character, to the servitude, and cannot be tolerated without compensation to the abutting owner. An interminable string of heavy drays may thunder through the street from early morning until set of sun, a menace to all who frequent the thoroughfare, and an inconvenience to all dwellers thereon; but the cars of a railway, which move usually but a few times a day, and with infinitely less annoyance to the public, upon tracks so adjusted to the surface as to occasion little or no inconvenience, cannot be tolerated. We fail to appreciate the philosophy of the distinction. On the contrary, we affirm that when a public street in a city is dedicated to the general use of the public, it involves its use, subject to municipal control and limitations, for all the uses and purposes of the public as a street, including such methods for the transportation of passengers and freight as modern science and improvements may have rendered necessary, and that the application of these methods, and indeed of those yet to be discovered, must have been contemplated when the street was opened and the right of way obtained, whether by dedication, purchase or condemnation proceedings, and hence that such a user imposes no new burden or servitude upon the owner of the abutting land. The object of the user being within the conceded rights of the public, the methods of its accomplishment are subject to legislative control, and subject, also, to an action for damages by any abutting owner, whether or not he may be vested with the fee to the center of the street, whose right of ingress and egress, or his right to light and air, shall be interfered with.

The thirteenth subdivision of section 862 of the Municipal Government Act of this state authorizes the boards of trustees of municipalities of the sixth class, of which Santa Ana is one, "permit, under such restrictions as they may deem proper, the laying of railroad tracks and the running of cars drawn by horses, steam or other power thereon . . . in the public streets." The world moves. Legislation in recent times has kept

pace with the progress of the age. The trend of judicial opinion, except where overshadowed and incrustated with *stare decisis*, is to a broader and more comprehensive view of the rights of the public in and to the streets and highways of city and country; and, while carefully conserving the rights of individuals to their property, the courts have not hesitated to declare the shadowy title which the owner of the fee holds to the land in a public street or highway, during the duration of the easement of the public therein, as being subject to all the varied wants of the public, and essential to its health, enjoyment, and progress. In *Paquet v. Mt. Tabor Street R. Co.*, 18 Or. 233, which was an action to enjoin a steam motor railway company from constructing and operating its road upon a street in the city of Portland and upon a county road outside the city, abutting upon both of which the plaintiff owned land, with the fee in him vested to the center of the street and road, and where no compensation had been made to plaintiff, the court in its opinion, by Thayer, *Ch. J.*, in deciding the cause against plaintiff, said: "The establishment of a public highway practically divests the owner of a fee to the land upon which it is laid out, of the entire present beneficial interest, of a private nature, which he has therein. It leaves him nothing but the possibility of a reinvestment of his former interest in case the highway should be discontinued as such. This view, I am aware, is contrary to the ancient doctrine that the owner of the fee owned the land subject only to such public uses, and that he had a right of action when the use was diverted to a different purpose. Such a doctrine may have been applicable where the ownership was merely subject to a right of way over the land; but where, as in modern cases, it is devoted exclusively to the purposes of a public thoroughfare, and the control thereof is committed to legally constituted authorities charged with the duty of maintaining it for such purpose, the doctrine becomes a vague theory, and should be laid away among the antiquities of the past age." *McQuaid v. Portland & V. R. Co.* 18 Or. 237, enunciates a like doctrine. In *Henry Gaus & Sons Mfg. Co. v. St. Louis, K. & N. W. R. Co.*, 113 Mo. 308, 18 L. R. A. 339, the supreme court of Missouri held, in substance, that the construction and operation of an ordinary steam railroad at grade in a public street under municipal authority is not a new public use of the street, for which compensation may be demanded by abutting owners, as in the case of property "taken or damaged," within the meaning of the constitution. The court said: "When land is dedicated generally, and without restrictions, or condemned, for a public street, in a town or city, the owner of the abutting lots, who secures the benefit of the street, and persons also who purchase and improve property thereon, hold their property rights subject to all the uses to which the street can be lawfully subjected by the public. New uses in the improvement in the mode of travel and transportation are constantly arising. When there is no restriction on the public use, new modes of use may be adopted, which are consistent with the proper use of the street, without the consent of abutting owners, though

such new use may interfere somewhat with their own convenient use of the street."

(Supreme Court of California, *Montgomery v. Santa Ana & Westminster R. Co.*, 25. Lawyer's Reports Annotated 654.)

Alighting from Electric Car at other than regular stopping place. Failure to warn passengers.

A passenger on an electric car is not guilty of negligence as a matter of law in alighting before the car has reached its usual stopping place, where it has come to a full stop, no warning not to alight is given, the appearance of the surroundings are such as to indicate that the stop is made for that purpose, and substantially all the passengers alight.

It is not negligence as a matter of law for a passenger on an electric car to alight on the inside of a loop used for turning the car around without reversing or switching, where such passenger has previously been helped off the car by the conductor inside the loop, the car is so constructed that passengers may alight from either side, and no warning or notice is given to the passengers to step off only on the outside of the loop, and the cars are crowded with passengers and as soon as some alight others take their place.

(Supreme Court of Michigan, *Poole v. Consolidated Street R. Co.* 59. Northwestern Reporter 390.)

Injury to Child—Negligence of Parent—Avoidable Accident.

Recovery may be had by parents for the killing of their child under the age of two years by the negligent operation of a street car, although the mother was guilty of negligence in allowing the child to be upon the street, where its death could have been avoided by the exercise of ordinary care upon the part of the driver.

(Supreme Court of Missouri. *Czesewzka v. Benton-Bellafontaine R. Co.* 25 South Western Reporter, 911.)

Failure of Driver to Watch Horses—Runaway Team—Injury to Passenger.

A street railway company is liable where its driver negligently leaves the horses attached to a street car unhitched and without any one to hold them during his temporary absence, so that they become frightened and start to run away, causing a passenger to apprehend danger and attempt to get off the car, where she falls and sustains personal injuries.

(Texas Civil Appeals Court. *Texarkana Street R. Co. v. Hart.* 26 South Western Reporter, 435.)

Standing on Platform of an Electric Car—Contributory Negligence.

Contributory negligence cannot be predicated, as a matter of law, of the act of a passenger upon an electric car in standing on the platform of the car, where there is evidence tending to show that the car was crowded at the time and that there was no room for him on the inside.

(Appellate Court of Indiana. *Marion Street R. Co. v. Shaffer*, 36 North Eastern Reporter, 861.)

Distance Between Tracks on Curve—Injury to Employee—Assumption of Risk.

A street car company has the right to construct its tracks leading out of a car shed so close together and so curving in opposite directions that the ends of two cars standing on such curves will come together, and is not liable to an employee having his leg crushed between two cars, who knows, or ought to know, of the danger, although it would have been safer to have placed the tracks further apart.

An employee in a street car stable and car sheds assumes the obvious risk of having his leg caught and broken between the ends of two cars on curves leading out of the shed in opposite directions, as one of the cars being taken out is swung against the end of another standing on the other curve, at a point where the tracks are close together, although he did not in fact know or appreciate the danger, where he has had ample opportunity to observe it.

The fact that the risk of an employee's being caught between two street cars at a point where the tracks leading out of the car sheds were close together was increased during his term of employment by the use of longer and wider open cars, will not render the street car company liable to him for injuries thus received, where he continued in the employment without protest or promise of change, thereby accepting the additional obvious risk.

(Supreme Court of Massachusetts. *Goldthwait v. Haverhill & G. Street Railway Co.*; 36 North Eastern Reporter, 486.)

Joint Negligence of Street Car Company and Railway Company—Injury to Street Car Passenger.

A passenger in a street car, who sustains injury to which the negligence of the street car company and a railroad company, over whose track the car was passing, contributed, may recover of either company.

(Supreme Court of Iowa. *Douglas v. Sioux City Street Railway Co.*; 58 North Western Reporter, 1070.)

CAR ADVERTISING CONTRACTS.

Sacramento has handed down a decision in a street car advertising suit, which seems to determine that a contract for exclusive advertising privilege does not cover advertisements on transfers. The old management of the Central Electric Railway Company made an advertising contract with Todd & Ginsberg on a basis of \$6 a car a month for two years. The company sued for \$234, three months' rent. The defendants claimed they were prevented from carrying out their contract the last ten months of its life, and that they suffered \$250 damage on account of the company placing an advertisement on its transfer checks. A verdict was rendered in favor of the street railway company. The new management had nothing to do with the case.

John Oliphant, Jr., has retired from the position of manager of the Calumet Electric Railway, Chicago.

MACHINE ROLLED CHAINS.

A curious and interesting invention is reported by American consul, J. C. Monaghan, Chemnitz, of rolls for making chains, which seems destined to completely revolutionize the whole trade of iron and steel chain making. It does away with the welded joint, and secures uniformity, rapidity and increased strength in construc-

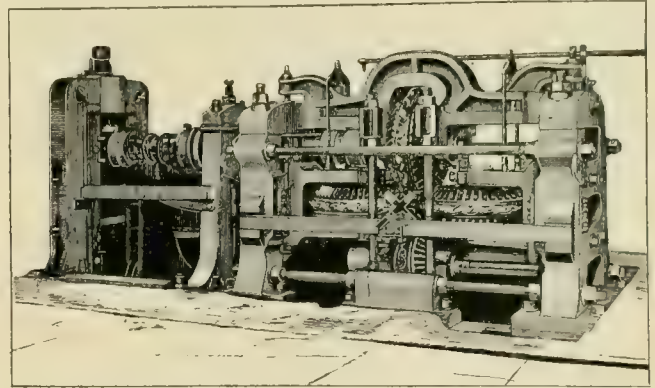


FIGURE 1.

tion. "It was brought to my attention," he says, "during an investigation of tin rolling. The new machine resembles somewhat the machine or roll that sinks impressions in hot or steamed wood, i. e., its mode of working is

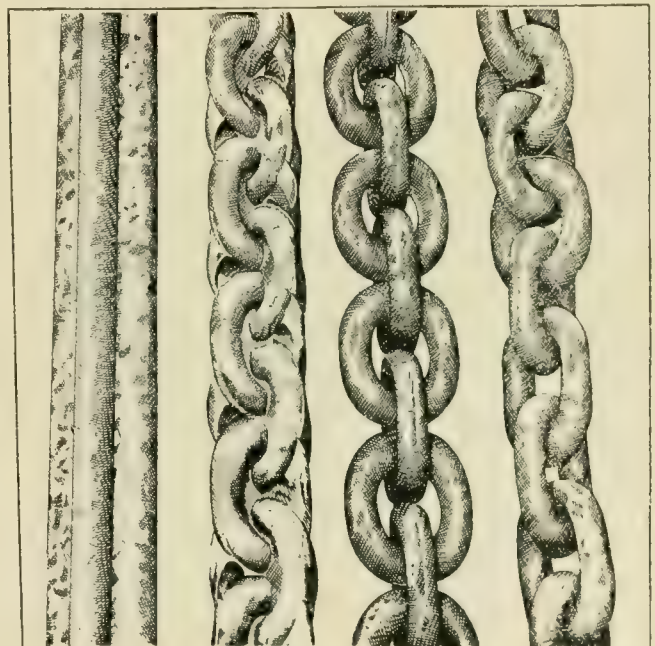


FIG. 2

FIG. 3

FIG. 4

FIG. 5

similar. There is, first of all, the roll (fig. 1), and, second, a peculiarly formed bar of iron (fig. 2). The rolls are four in number, and are so situated and so arranged that they work simultaneously on the curiously formed iron bar, cutting it into links. A glance at fig. 1 will reveal much more of the *modus operandi* than any description in words would do. The curves that look like chain links are the highly tempered, i. e., hardened, steel dies or cutters. The gears fit into each other and operate

simultaneously on the four flanges of the iron bar. At a point just back of the cross, that is, in front of the gears of fig. 1, the projecting cutters of the gears almost meet. Through this point passes the iron or steel bar at white heat. The gears revolve rapidly, turning out 3 to 4 yards of chain per second. The iron bar that goes in looking like fig. 2, comes out looking like fig. 3. By means of tongs, and cutters, and molds, fig. 3 is made to look like fig. 4, in which the links are held together by very thin bits of iron which are easily cut. After some little labor in cleaning the links, the chain is run into a furnace, heated red, and then run through rolls to give its links the shape seen in fig. 5. It is claimed that this machine made chain is better than the hand welded; that it does not require wrought or welding iron, but that it gives better results with fused irons and steels."

UNIFORM SPECIFICATIONS.

New specifications for summer uniforms have been issued by the Chicago City Railway Company, to be in effect from April 1 to October 1, when a bulletin will be issued specifying the style of overcoat for conductors. Following are the specifications:

CONDUCTOR'S COAT.

To be made of blue tricot cloth. Lining to be of good quality black mohair serge and sleeve lining to be good quality twilled sateen; same to be approved by this company.

Coat to be cut double breasted and square corners.

Collar to be made of same cloth as coat.

Ten regulation buttons, five on each side.

Two small buttons on each sleeve.

One outside breast pocket.

One inside breast pocket.

Two skirt pockets.

Two outside ticket pockets.

Two inside ticket pockets.

All pockets to be made of ten ounce duck.

Outside ticket pockets and skirt pockets to be leather bound, narrow, and coat to be cut of sufficient length to cover seat well.

Price of coat to be \$9.50.

Coats of gripmen, motormen and drivers, are the same as conductors, except there is only one outside and one inside ticket pocket of silesia, without leather binding. Price, \$9.50.

Vests are to be of same cloth as coat, single breasted, without collar, cut high, and six regulation buttons. Price, \$1.25.

Conductors' trousers are to be of same material as coat and vest, cut and trimmed regular; pockets to be of heavy drill. Price, \$6.25.

A regulation cap is provided for \$1.25, which must be worn by all employees of the transportation department. It has a wire frame, which prevents shrinking and admits of ventilation, at the same time being light. Uniform coats, vests and trousers, can be procured from three

firms, upon orders from the company, and three firms supply caps without orders. In winter, gripmen, etc., are only required to wear regulation cap and badge, from October to April, the remainder of their garments being left to their choice.

These uniforms are made by C. F. Orr & Co., 130 La Salle street, this city, who have, within the past ten years, made many thousands of uniform suits for the City Railway alone. Their system of measurements, cutting, manufacture and inspection of garments, is at once complete and very systematic, and cases where alterations are necessary before delivering to wearer, who comes and tries on the uniform, are extremely rare. Uniforms made under this system give a much better service and keep a good appearance longer than under a former arrangement where the garments were made by custom tailors. Price is also much less.

RECORD OF REGISTER ENDINGS.

C. A. Derr, superintendent of the Rochester Electric Railway Company, Charlotte, N. Y., has sent the REVIEW a blank for recording endings of stationary registers. It is simple and tells at a glance the readings of registers in eighteen cars. The blank which is here reproduced tells its own story.

C. E. Loss & Co. are busy on several contracts. They have secured the contract for everything for 9 miles of road at Hot Springs, S. D.; will lay twelve miles of track on Wentworth avenue for the Chicago City Railway Company, are shipping rails for 46 miles of interurban road at Oshkosh, Wis., and by May 15, will complete the Waukesha, Wis., line. The firm also has the contract for the reconstruction of the St. Charles Street Railway Company and the Orleans Railroad Company, both of New Orleans, 24½ miles.

Register Endings.

Date	Car No.	18
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	11	
	12	
	13	
	14	
	15	
	16	
	17	
	18	

Taken by

The Ranken & Fritsch Foundry & Machine Company, St. Louis, will supply one 500-horse-power and one 1,000-horse-power engine and boilers for the Tillotson interurban, from Oshkosh, Wis., to Kaukauna, and the St. Louis Car Company has the contract for 20 single and 10 double truck cars. The Illinois Steel Company will furnish the rails.

UP MOUNT VESUVIUS.

The incline railway up the crater of Mount Vesuvius owes its existence to the enterprising tourist excursion managers, Thomas Cook & Son. The ascent to the classic crater, once very difficult, is now easy and is made possible for all. Excellent ideas of this road and its surroundings can be obtained from the accompanying engravings.

The incline is 2,700 feet long and the vertical ascent

in that distance is 1,300 feet. The minimum incline is at the lower station and is 22 degrees. The maximum is 32 degrees at the upper station. The road is double track, arranged to have one ascending and one descending car. The cars run on a central vignole rail laid on



THE START.



THE FINISH.

a beam. On each side and near the bottom of this beam are flat rails, against which the guide wheels run which keep the cars upright. The ballast consists of ashes secured against sliding down hill by masonry pillars built at distances of 200 to 400 feet, on a solid stratum of lava. The cable is driven from the lower station by a 30-horse power double cylinder steam engine. This is geared to two cable driving drums. Each cable is endless and has two cars attached to it. Each car thus has two cables.



UP MT. VESUVIUS BY CABLE.

The tension carriages for the cables are held by weights suspended over a pulley. Wooden supporting pulleys are set every 50 feet along the line. The cable speed is $6\frac{1}{2}$ feet per second. The cars with a load of ten passengers weigh about three tons. For safety, two independent ropes are laid and the cars have automatic grips and hand brakes. The ropes are $1\frac{3}{8}$ inches in diameter, rated at a braking strain of 32 tons. They were furnished by Felten & Guigleunie, Germany, and the Warrington Wire Rope Works, Liverpool. The cost of the entire work was \$125,000.

SOLID VS. SPLIT GEARS.

In the days of cast iron gears, the idea of using a solid gear pressed on in the same way as a car wheel, would have been justly laughed at, and considered the height of foolishness. It has been found by experience that it is the worst kind of false economy to buy cast iron gears, as steel gears will last many times longer in proportion to their cost. Indeed, it has come to pass that in modern practice, the steel gear wheel outlasts the wheels on the axle on which it is located. This has led up to a trial on several roads of a solid gear wheel pressed on by hydraulic pressure. There is of course the objection that in case a gear is stripped or cracked, the axle has to be taken off a car. To counteract this objection, is the fact that a gear that is pressed on is not as liable to be broken as one that is bolted and keyed, because it is not likely to come loose. Besides this, good steel gears are seldom broken on well managed roads and as said before outlast the wheels. The arguments for and against solid gears are so nearly balanced, that there does not seem to be much to choose between them. If a pressed on gear is used, the axle should be made with regard to it and should be turned from 1-64 to 1-32-inch larger at the point where the gear is to be put than any other point. It is very likely that solid gears will gradually grow in favor, as being a simpler and more substantial form of construction. The constantly improving facilities which electric railways have for taking out axles and pressing wheels, will tend to the use of solid gears, unless some serious objection should develop.

PROMOTER COMES TO GRIEF.

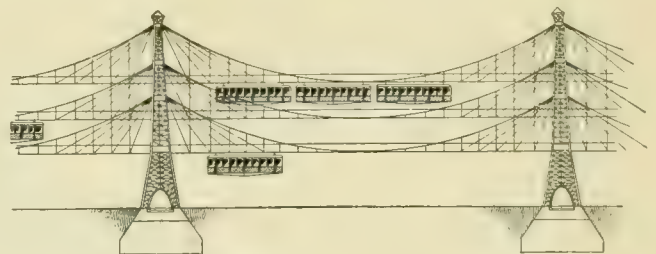
Lewis E. Walkins was arrested in Worcester, Mass., for obtaining money under false pretenses. It is said that he has been interested in a great many electric railway schemes, which existed only on paper and as is necessary in order to inspire confidence he was extravagant in his mode of living, and left a great many bills unpaid. He is about 35 years old, medium height, wears a thin moustache and occasionally a dark beard. He has steel blue eyes, bad teeth, speaks with a drawl and in appearance is not neat. He claims to have hailed from various sections of the country and to have been connected with some of the most prosperous railroads in the south.

Following are the companies he has started to promote, none of which had much paid in capital, or resources:

United States Automatic Service Company, \$25,000 capital, dynamos, motors and automatic postage stamp sellers; American Railroad & Canal Equipment Company of Massachusetts, \$300,000 capital, the bonds of which he attempted to float in Washington and Baltimore, but was exposed by Bradstreets; Boston Underground Trolley System; L. E. Walkins, mechanical and electrical engineer, contractor and builder of electric railways and power plants; City & Suburban Railway Company, \$100,000, Worcester; Marlboro & Westboro Street Railway Company; Missouri, East Tennessee & Virginia Air Line; Midland Tennessee Telegraph Line; Kingston Town & Terminal Company; John F. Walkins' Sons Company; Luther C. Walkins Corporation; president of Chesapeake & Carolina Railroad.

THINKS HE HAS SOLVED RAPID TRANSIT PROBLEM.

J. R. Hawkins, Mountainville, Orange county, N. Y., thinks he has solved the rapid transit problem, by "the Elevated Suspended Rapid Transit Railroad with Triplex-Service System." He has three plans which are essentially the same, except elevation, and that in one the cars run on wheels on track, while in the other the cars are suspended from cables, the wheels being on the top of the car. Towers are to be built 280 feet apart



TRIPLEX-SERVICE RAPID TRANSIT SYSTEM.

from which cables are suspended as shown in the illustration. The bottom of the lower car is supposed to be 16 feet above the surface of the ground. This is designed to be used for surface traffic, the middle car, for long distances, and the upper for rapid transit.

The plan is in no respect either new or novel. In the mountains of the west, wire rope suspension for conveyance of ores has long been in use, and in Mexico and South America such systems are employed. In some cases spans of a half mile are found crossing canons and gorges thousands of feet deep. Practically the Hawkins scheme was proposed for Chicago by St. John, who flourished great trumpets but was never heard of since. The suspended cable plan will never work on account of the great stretching and sagging tendencies of the cables.

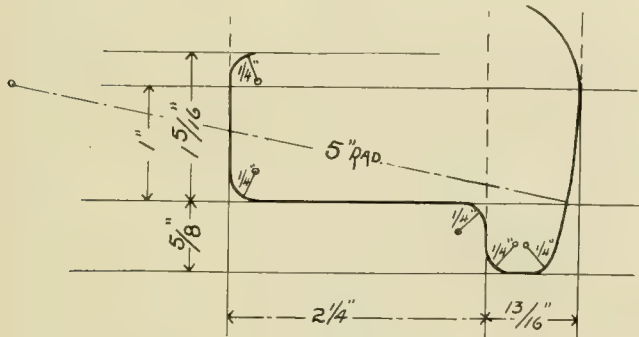
The Jacksonville, Fla., Street Railroad Company has opened its Bay Street line.

STREET RAILWAY WHEEL TREADS AND FLANGES.

Is a Standard Desirable?—Is it Practicable?—If so, what should it be?

PART III.

As a sequel to Mr. Beeler's advocacy of a flat tread conforming with the flat head of the rail we show herewith, the standard tread and flange of the Denver Tramway Company. This form corresponds almost exactly with the head of the shanghai T rail used by that company. It would be interesting to compare the wheel wear on this road with that on roads using a bevel



STANDARD TREAD AND FLANGE—DENVER TRAMWAY.

tread. The wear on these wheels ought not to change the general form of either rail head or wheel tread. With the flat headed rail and beveled tread wheel commonly used at present, it is impossible for wheels to maintain their original shape after wear. American steam and street railway practice both agree in using such a combination of beveled wheel and flat headed rail. There was a time when steam road practice tended toward a round headed rail, corresponding more closely to the Master Car Builders' standard wheel, than the one now used. This form has been generally given up, because it was found that sharp flanges are not caused by square cornered rails, but by trucks out of square. Conditions of wheel wear are very different on steam roads from what they are on street roads. On steam roads the wheel treads are very much wider than the rail heads; street railway wheel treads are very nearly the width of the rail head. The practical effect of the common practice of running beveled treads on flat head rails, is to bevel the rail and level the wheel tread. The European steam road practice is, to bevel the rail as well as the wheel, which practice is being followed by the Chicago City Railway on the track laid by it this season.

All these points as to bevel, shape of flange, etc., should be investigated in the light of practical experience. If such an investigation is carried on by all the larger roads, it will be possible in the course of two years more to find out what is actually the best shape. The adoption of a standard will then be merely a matter of form.

The Association of Manufacturers of Chilled Car Wheels and the Master Car Builders and Master Mechanics Association, came to an agreement several years ago

as to the tests that a wheel should undergo before acceptance by a railroad company. An agreement was entered into at the same time, whereby the wheel maker receives remuneration directly, in proportion to the mileage a wheel runs before thrown out. This led the steam roads to keeping an accurate record of the mileage of all wheels. This method of paying for wheels is eminently just to both maker and railroad company, as the maker receives pay for exactly the value to the railroad company of the wheels he furnishes. Flat wheels and sharp wheels are not charged to the maker, as they are not caused by legitimate use. Under this agreement a standard wheel mileage is guaranteed for a wheel in a given service. For example, 33-inch passenger wheels are guaranteed for a mileage of 60,000 miles. Suppose that the price paid the maker when the wheel is accepted be \$10, the total value of the wheel. In adjusting the price allowed the maker when the wheel is scrapped, it is understood that the value of the worn out wheel is forty-five per cent of its first cost and that if the wheel runs exactly its guaranteed 60,000 miles, it will cost the railroad 55 per cent of its first cost, so that the railroad will in this example pay \$5.50 for the wheel, or 9.11 cents per thousand miles. If the wheel falls below the guarantee, 9.11 cents are subtracted from the maker's \$5.50 for every 1,000 miles short of the guarantee. If the wheel runs over the guarantee, 9.11 cents are added to the maker's share for each 1,000 miles in excess.

MOTORS FOR CARRIAGES IN PLACE OF HORSES.

Strong competition is promised stage lines by the motor driven carriages of the De La Verge Motor-Wagon Company, New York. Where traffic is so light that even an electric railway could not earn the interest on first cost, there the motor-wagon will find its field, and relieve many suffering horses of their heavy loads.

The wagon first came into favorable notice at the Munich exposition of 1888, and since that time it has been improved in every way, so that the present vehicle is said to be in every way a perfect success. A variety of styles have been constructed, but the latest is a phaeton in the form of a wagonette, to carry seven persons. Bodies for a large number of these wagonettes, to be used in the United States, will be made by Hincks & Johnson, carriage builders, of Bridgeport, Conn.

The motor was invented by Carl Benz, of Germany. It is an improvement on the ordinary gas engine, and uses vapor of gasoline, naphtha or kerosene. The oil is carried in a tank under the seat, whence it passes to a smaller tank, where air is drawn through it. The vapor-laden air is conducted into the engine cylinder, where it is exploded by an electric spark, and by its expansion drives the piston forward. From the engine shaft the power is transmitted to the wagon wheels by a link belt. The wagons are equipped with engines of three or more horse-power, enabling them run up hill, or to travel on level roads at the rate of 20 miles per hour.

The cost of operating it is said to be "twenty-eight cents for a run of 250 miles," which is absurd. A test of the Benz engine was made in 1886, at the Karlsruhe Exhibition, and reported by Schottler, in *Die Gas Machine*, and the consumption of gas was 25 cubic feet per horse-power per hour. This is equivalent to 4 cents an hour per horse-power, where gas costs \$1.50 per 1000 cubic feet. For a motor of three to five horse-power, the cost would be from 12 to 20 cents per hour.

"LIGHTNING" STRIKES THE SERIES-PARALLEL CONTROLLER.

The London electrical paper, "Lightning," got into the series-parallel controller the other day, short circuiting the contact rings and playing havoc generally. This is the result: "The 'series-parallel controller' has been used in various forms for road cars since the inception of electric traction, but no standard type seems to have come into general use even in America, and the plain rheostat still finds favor on many lines. According to the *STREET RAILWAY REVIEW*, however, watt-meter tests have recently been taken on the individual cars of one of the largest electric railway systems of the west, showing that the consumption of energy with the series-parallel controller is less than that with the rheostat by 25 per cent. Our contemporary's leaderette does not make it clear whether this saving of power obtains on the average running or only at low speed. * * * * *

The chief objection to the series-parallel controller is obviously the complicated nature of the connections. But if a net saving of power of 25 per cent can be effected, the complications will have to be met by improved mechanical details, unless a practical form of variable speed-torque gear be forthcoming—which is by no means impossible."

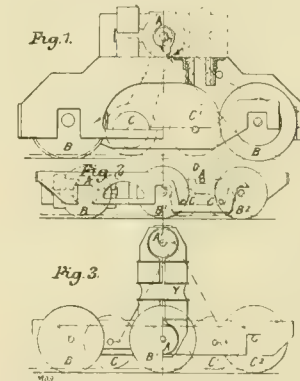
If the editor of our enterprising contemporary should make a visiting tour among the electric railways of America, he will find that while there are still many cars running with rheostat control, every road is discarding rheostat control and putting in series-parallel controllers as fast as its finances will permit. The series-parallel controller has come to be accepted as the proper thing, just as single reduction motors have been accepted in the past. Not every road will throw out its old motors and controllers at once, but the change is coming surely and slowly. The 25 per cent saving was, of course, made at all the speeds incidental to a city service. Our contemporary must be aware that the saving with series-parallel control approximates 50 per cent at low speeds. The only important difficulty ever experienced with series-parallel control is the arcing which takes place at certain points. It was only after some years of study that this difficulty was overcome, and consequently this form of control has only recently come into general use, although it was tried on the first Sprague equipments.

The coming off of a controller handle of a Brooklyn trolley car at a critical moment caused a collision recently.

ELECTRIC LOCOMOTIVE WITH AUXILIARY RACK GEAR.

The introduction of a very short length of rack railway on a grade would often save a considerable sum in the cost of construction; and to meet the demand for a locomotive that will operate by rack as well as adhesive traction an English inventor, J. Imray, of London, has designed the arrangement of motor and gearing shown in the engraving.

In Fig. 1 a single motor, A, with two sprocket wheels on its armature shaft, drives by chain gear the axle of one of the pairs of adhesion wheels, B, B¹, and also one of the axles of the rack pinions, C, C¹, by a proportional sprocket wheel on the axle of the pinion, C. The two sprockets on the armature shaft are engaged or disengaged with it by friction clutches. In Fig. 2 one motor drives directly the pair of adhesion wheels B which may be connected to the



other pairs B¹, B², by cranks and side rods, or an intermediate pinion; and their motor or pair of motors on the shaft A¹ is arranged to drive directly a pinion, D, intermediate to the two rack pinions C, C¹.

In the arrangement shown in Fig. 3, one electric motor, A, has on its armature shaft cranks coupled by side rods to the cranks on adhesion wheels B, B¹, B². Another electric motor A¹ has cranks coupled by connecting-rods to cranks on the axles of the two rack pinions C, C¹, there being in each case for each pinion, as also for each pair of adhesion wheels, a crank on the one side of the vehicle, and a crank at right angles to it on the other side of the vehicle, with corresponding pairs of cranks on the armature shafts of the motors. In this case the motors are so arranged that their field magnets have a yoke Y common to both.

WILLIAM A. HAMMETT.

William A. Hammett, the well known engine salesman, died of heart disease March 21, at Boston, Mass. He was 47 years of age, and at the time of his death and for six years preceding, was New York manager for the Hoover, Owens & Rentschler Company, engine builders, of Hamilton, Ohio.

PAVING FOR FENDERS.

Washington, D. C., street railways have been ordered to adjust the paving between tracks in order to accommodate fenders. By April 1, no paving of any kind can extend above the top of rail. Even hinges of grip hatches of cable roads must be lowered, as they interfere with wheel guard fenders adopted by the commissioners.

LOMBARD WATER WHEEL GOVERNOR.

One great difficulty that has hindered the adoption of water power for driving generators for electric roads, counteracting all its advantages, is the difficulty of obtaining a governor which will regulate. The Baltic Power Company, Baltic, Conn., has used the Lombard water wheel governor. The plant consists of three pairs of Holmes' horizontal wheels working under 35 feet head, which drive two General Electric three-phase generators at Baltic, two G. E. three-phase motors developing 400-horse-power, at Taftsville $5\frac{1}{2}$ miles away, also driving the generators of the Norwich Electric Railway Company 12 miles away from the power plant, besides operating a 250-horse-power electric locomotive which moves freight cars from Tafts to Taftsville on the New York & New England Railroad. A small incandescent machine is also driven from the jack shaft at Baltic.

The standard type of governor made by the Lombard Water Wheel Governor Company, Boston, is used in this plant, and has given satisfaction. It consists of a hydraulic piston which applies its thrust in either direction to the rack, pinion and gears at the left side of the machine, and the gears transmit the motion of the piston to the gate mechanism of the turbine. The

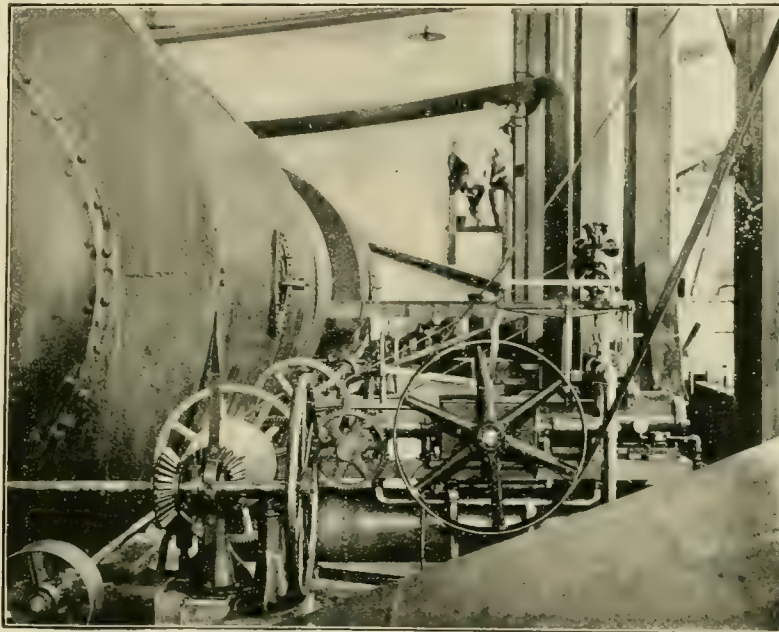
air is contained in a tank under the bed plate of the governor, the pressure being maintained at 15 atmospheres, 210 pounds gage pressure, by a pump operated by the hand wheel. The machine is made in three sizes, known as A, B and C, the hand wheel being on the front of the smaller and the back of the larger machines.

The centrifugal governor balls actuate a perfectly balanced piston valve which stands in the circulating system, having a lap of $\frac{1}{8}$ of an inch, and a motion of that distance one way or the other, as the speed varies, causes

the hydraulic piston and train of gears to open or close the gates of the turbine. Fig. 4 is a diagram showing the load in horse-power between 6:20 P. M. and 6:50 P. M. March 6, 1895, taken at Baltic. The figures at the bottom of the diagram represent minutes, at each end, load in horse-power, and the crooked line, the variation of load each half minute. When the diagram was taken, the mills, at Taftsville were shut down, and the load consisted only of the Norwich Electric Railway and the electric loco-

otive, the railway alone being more difficult to govern than the railway and mill combined.

The diagram presents an interesting study. At 6:27 P. M. the load was 57-horse-power, and half a minute later it jumped to 273-horse-power, an increase of 216-horse-power. At 6:28 P. M. the load was 446-horse-



LOMBARD WATER WHEEL GOVERNOR, BALTIC POWER COMPANY, BALTIC, CONN.

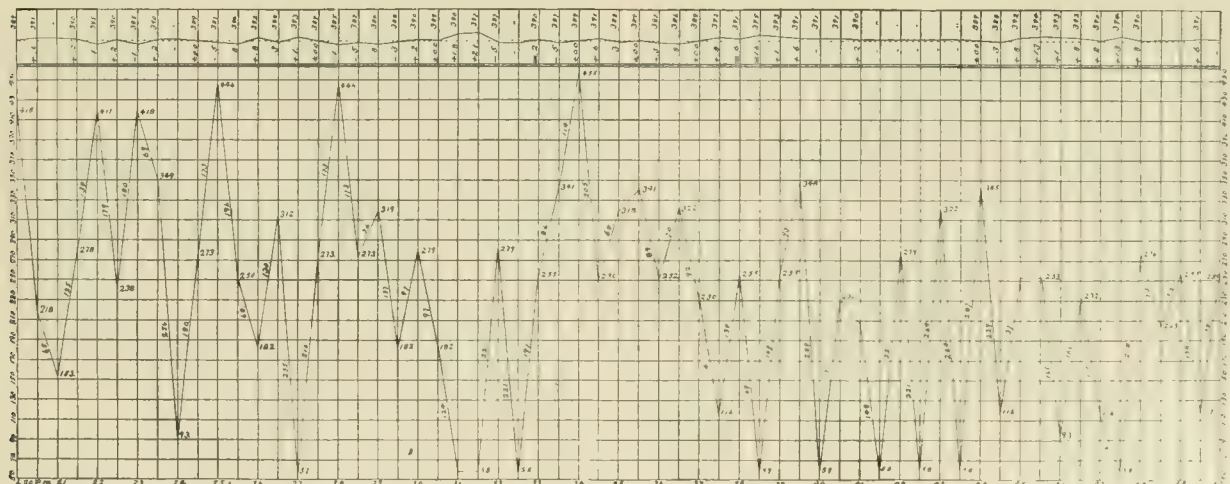
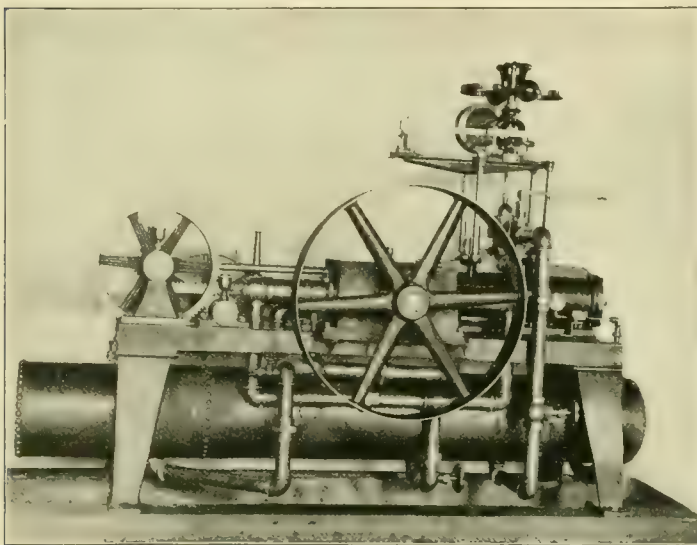


DIAGRAM OF LOADS—BALTIC POWER COMPANY.

power an increase of 173-horse-power in half a minute, or a variation in load in one minute of 216 and 173, or 389-horse-power. By following the vertical lines to the top of the diagram the variations in speed may be seen. The dotted line shows the speed at which the wheels should have run and the full line shows the speed at which they did run. The figures above the speed line show the revolutions per minute of the tachometer shaft;



TYPE B, LOMBARD WATER WHEEL GOVERNOR.

and the figures below the speed line show the per cent variation from normal speed.

By referring to the diagram at 6:32½ P. M. it is seen that the speed was $\frac{2}{10}$ of 1 per cent above normal speed. A load was suddenly thrown on and the speed fell $\frac{5}{10}$ of 1 per cent below normal, but recovered at once to where it should be, so that at 6:34 it was just right, although the load had increased 397-horse-power.

RULING ON TRANSFERS.

George W. Costell was given a transfer on the Second Avenue Traction Company's line, Pittsburg, Pa., but neglected to board the first car leaving the transfer point. He boarded another car, from which he was ejected by the conductor, the time limit having expired. He sued for damages and the jury allowed him \$80. In his charge to the jury, Judge Porter said: "If a transfer check is given the passenger and it is properly punched, then the obligation is upon such passenger to take the first car from point of transfer. But the passenger should be allowed a reasonable time to examine the check and see if it was punched correctly. If this is done and then the transfer check is refused, the company is liable."

The bill requiring street car conductors to take the names of witnesses to accidents and report them to the police department has been rejected by the Massachusetts house of representatives.

TWO HUNDRED MILLIONS CAPITAL.

Another long distance electric line has been incorporated in Illinois, with \$200,000,000 capital. The incorporators, James G. Hulse, Parker Crittenden and John W. Hill, all of Chicago, purpose to do a great many things, as is shown in their charter, as follows:

"To construct, equip, own, operate, lease, purchase, bond and mortgage and sell electric railways, both surface and elevated, and electric telegraph, telephone and signal lines in connection with said railways; to acquire, own, use, sell and license others to use inventions and letters patent for improvements in electric railways, cars, motors, brakes, trolleys, telegraph, telephone and signal devices, and other equipments thereof, and inventions and letters patent for improvements in railway passenger coaches, sleeping cars, freight cars, express cars, mail cars, fruit cars, refrigerator cars and stock cars; to construct, lease to others, use and sell said improved cars, motors, brakes, trolleys and all other equipments for railway service, and to promote the formation of companies for introducing and using said improvements, or any of them, in any part of the United States and in foreign countries; also to manufacture, acquire and use power of all kinds in connection therewith; also, to manufacture, purchase and sell water power and electric power; also to construct, equip, own, operate, lease, purchase and sell electric light plants; also, to construct, purchase, lease, sell and operate water rights, canals, ditches and dams; also to acquire and own sufficient land for carrying out the purposes herein specified; also, to issue bonds and mortgages on property and franchises."

Mr. Hulse said the object of the company was to build a surface electric road between Buffalo and New York and deliver at the seaboard all the grain unloaded from lake steamers at Buffalo. He said a Chicago woman had invented a new trolley and that her patents would be used. The road would ultimately be extended to Chicago. Trains would be made up of small cars carrying from eight to ten tons of wheat.

Mr. Hill had a different idea of the company. He said it was organized to build an elevated electric line from San Francisco to New York, via. Chicago, and would run trains at the rate of 100 miles an hour. "It will take \$40,000,000 to build the line from Chicago to New York. Three years will be required to organize the company and get charters from the various states."

We are anxiously waiting for the three years to pass.

"Give me a transfer to the Gallagher," said a passenger on an Indiana avenue car who wanted to be transferred to the Van Buren street car. The conductor didn't know what the passenger meant. Then the passenger gave him a diagram. "I call that Van Buren street car the Gallagher because the conductor always lets it go before I can get it."

REQUEST FROM CLAIM AGENTS.

Mason B. Starring, assistant general counsel of the Chicago City Railway Company, has sent out the following request to claim agents:

Will you kindly inform me whether or no Mr. Isaac Siff or David Semanski, hereafter described, have ever presented a claim against you or your company for personal injuries?

On May 2, 1893, Messrs. Isaac Siff and David Semanski claimed to have been riding upon a grip car, which collided with a wagon, and both have sued this company for injuries alleged to have been sustained therein. They have had an acquaintance with each other of twenty-five year's standing; both, as indicated by their names, are Jews; both are peddlers of feather dusters, to which line Mr. Semanski adds silverware, and possibly other goods, and both have met with accidents, other than the one for which they are now suing us.

Mr. Siff was insured in the Commercial Travelers' Mutual Accident Association of America, and also in Montefiore Lodge, No. 190 Knights of Pythias. I am informed that in 1892 he had an accident in the city of Chicago, by slipping on a sidewalk. In January, 1893, he claims to have slipped on some ice in Toronto, Canada. I am informed that he also met with an accident in Toronto, by slipping or falling on a railroad platform.

In June, 1887, Mr. Semanski prosecuted a suit against the Philadelphia and Gray's Ferry Passenger Railway Company, for a dislocation of his shoulder in April, 1887. On the trial of that case he admitted that it had been dislocated several times before, one date being given as August 30, 1886. He says he has been a witness in a suit against a railroad company in a case where a partner of his had a dispute with a conductor concerning a ticket. The favor of an early reply is respectfully requested.

No doubt, every claim agent who has knowledge of these two men will furnish Mr. Starring with the information. This letter emphasizes the importance of an association of claim agents for street railways, which could hold its meetings at the same time and place as the American Street Railway Association. Should it be thought advisable, sessions could be secret. Information of any kind could be bulletined to members as often as necessary during the interval between sessions, and the acquaintance of all the men in the same line of work would be valuable to the various companies. The rubbing together feature is perhaps the most important result of such an association. The steam road association finds it necessary to meet twice a year, and D. C. Richards, chief adjusting agent of the Chicago and Northwestern Railroad, who is vice-president of the association, says he never fails to pick up something of great value from his conversation with the members. One function of the steam road association is, that members look up witnesses in their own territory for foreign roads, which is a saving of money to all concerned, and disarms the suspicion that would arise if a stranger should make inquiries.

The REVIEW invites an expression of opinion from claim agents on the advisability of organizing an association. We should like to know in addition, what lines such an organization should work on to fully meet the requirements of street railways. It looks as if there was plenty of room for something of this kind in the street railway field.

The G. C. Kuhlman Company, Cleveland, secured the contract for supplying 30 closed cars with both side and end doors to the Cleveland City Railway Company.

OF INTEREST TO CLAIM AGENTS.

In Boston, a personal injury case, growing out of a collision of a herdic with a car, has been decided in favor of the West End Street Railway Company, on appeal by the plaintiff, who sued for \$20,000, alleging fractured skull. The lower court held, upon plaintiff's evidence, that she was not entitled to recover.

The full bench, in an opinion written by Judge Holmes, says: "The plaintiff seeks to charge the defendant for personal injuries suffered by her, on the ground that its car ought to have avoided a runaway herdic, which ran into it and did the damage. The grounds, however, stated, are pure matters of guess work. It is conjecture whether the driver knew that the herdic was coming. It would be prejudice to say that he ought to have known it if he did not.

"There is no evidence on either point which amounts to anything, except the relative situations. The time during which the herdic was in sight before the accident must have been very short.

"During the last part of that time, if not the whole of it, the car was making a sharp turn into Cambridge street, on the opposite side from Joy street, down which the herdic came, and the driver was stopping for passengers on his side, so that his attention naturally was drawn away from Joy street.

"But suppose the driver had known the danger, it was just as prudent for him to be where he was as to be anywhere else where he could have been. It is said that if he had gone a little faster the herdic would have cleared the rear platform, which it struck, or that if he had stopped in Chambers street there would have been no collision.

"This is very well after the event. But beforehand the driver could not tell where the horse would go. A horse car cannot be handled like a rapier. Within the narrow limits of the possible, so far as the evidence shows, a prudent man had no reason to think one spot safer than another. Exceptions overruled."

UNION STATION AT WASHINGTON.

A novel plan for a Union railway station at Washington, D. C., has been approved by the District Commissioners. Four different systems of tracks will be accommodated on as many floors. The building will be erected in the side of a hill, the main portion being underground. The Washington & Georgetown Railroad will use the lower floor; the Arlington road, the second floor; the Great Falls road, the third floor; and the Metropolitan Railroad Company, the top floor, if the plans are carried out. A hitch has occurred, the last named company having refused to have anything to do with the structure, whereat the Commissioners are greatly surprised. These autocrats of the District approved the plans without the slightest idea that the street railway company would defy their authority.



PART IV.

Undoubtedly the more simple the system of caring for lost articles, the better it is. The West Chicago Street Railroad Company has a very simple system, yet it is all that is needed for such a large company, which has five divisions and many cross lines. About 25 articles are turned in every day by the conductors, while during the World's Fair, the average was 30 to 40 a day. To take care of these articles only one book is required, the ruling of two pages being shown in this connection.

When a conductor finds anything, he is required to turn it into his barn, placing his name, badge number, line, and description of article on a tag, which he attaches to it. All articles are sent to the general manager's office. An entry is made in the lost article book, which is the chief record. At the end of 30 days, articles unclaimed are sent back to the divisions turning them in,

WEST CHICAGO STREET RAILROAD COMPANY											
LOST ARTICLES											
DATE	CAR NO.	STREET	CONDUCTOR	BADGE NO.	ART. NO.	DESCRIPTION	RETURNED	SIGNATURE	RESIDENCE	WAY	BILL NO.

and a way bill is sent to be signed by the finder, of the article, who now becomes the owner. There is very little bookkeeping required under this system, and it seems to answer every requirement.

All articles are stored in racks, and do not take up much room. The racks have pigeon holes about a foot square and extend to the ceiling of the room. The articles received the current month are kept in one rack, and those that have accumulated are kept in another section. Most of the finds are not very bulky.

The Chicago City Railway Company has a similar system. Each article has a tag which gives date, line, car number, article and conductor. They are kept in a large room specially built for this purpose, for 30 days.

ALMOST HUNG BY A TROLLEY ROPE.

Charles Bennett stopped at a curve, before crossing the track, to let a Chicago electric car pass. Just as it reached him the wind swung the rope in his direction and it caught him by the neck. It instantly tightened, jerked him off his feet, and dragged him several yards. The strain on the rope was so great that the trolley was pulled from the wire, and of course the car stopped. Mr. Bennett lost some skin from his throat, and his neck was strained, but otherwise he is all right.

MEXICO'S GRAND INTERNATIONAL EXHIBITION.

Beginning April 2, 1896, and lasting six months, Mexico will have her first grand international exposition. The ground, 600 acres in extent, has been purchased by the Mexican Exposition Construction Company, and the buildings will be erected with a view to permanence. There will be a Grand Court, Mexican National Court and Foreign Court. The Mexican government will treat all goods and articles imported from abroad as in bond, no duty being demanded unless they be sold, and material and machinery for the buildings will be admitted free. The government will use its influence to secure reduced freight and passenger rates. There will be a system of awards made by an international jury. The management has also devised a lottery scheme, sanctioned by the government, the prizes to be purchased from exhibitors. Felipe-Berriozabal, Mexican consul, 126 Washington street, Chicago, or A. K. Koney, president American-Mexican Exposition Company, 604 Clay street, San Francisco, will be glad to give information. The electric exhibit will be purchased.

ASSOCIATION OF ENGINEERING SOCIETIES.

By the recent admission of the Technical Society of the Pacific Coast to membership in the Association of Engineering Societies the influence of the latter is extended from the Atlantic to the Pacific ocean.

Organized in 1881, the association now comprises eleven societies, as follows: The Boston Society of Civil Engineers, Western Society of Engineers, Civil Engineers' Club of Cleveland, Engineers' Club of St. Louis, Civil Engineers' Society of St. Paul, Engineers' Club of Minneapolis, Engineers' Club of Kansas City, Montana Society of Civil Engineers, Denver Society of Civil Engineers, Association of Engineers of Virginia and the Technical Society of the Pacific Coast.

The proceedings of the eleven societies contain valuable data and recent information on engineering, all of which is gathered together and published in the Journal of the Association, which is issued monthly from the office of the secretary, John C. Trautwine, Jr., Philadelphia, Pa.

Clift Wise & Co., Chicago, have contracted for the reconstruction of the track of the Chicago City Railway on Archer and Ashland avenues—in all, about 15 miles.

USE OF THE CAMERA IN SETTLING ACCIDENT CLAIMS.

As a general proposition it will not be denied that the most efficient claim department is that which settles a maximum of claims at a minimum of expense. It should be the aim of every company, therefore, to endeavor to place this branch of its service in the most perfect condition possible. It is far easier to change a man's opinion, when he can be shown that there is evidence to prove that it is not causing the effect he hopes it will, and when he is thus disappointed, his ideas of value are changed, so that he is more easily influenced to settle for a reasonable amount than when negotiations were begun.

The camera brings unimpeachable evidence whenever it is called upon. It has been used to some extent to furnish evidence in litigation, but its use is only in its beginning. At the last meeting of the Association of Railway Claim Agents the use of the kodak or similar photographic instrument was thoroughly discussed and recommended as an important piece of furniture for increasing the efficiency of the claim department. In discussing the question, Edward B. Pierce, of the New York & New England Railway, who opened the debate, said:

"The kodak is and can be made useful in the settlement of claims. I take it that the investigation regarding claims made for personal injuries is for four purposes. First, investigation for the purpose of satisfying yourself as to the probable liability on the claim; second, for the purpose of obtaining information with which to satisfy the superior officers of the road; third, investigation after you have satisfied yourself as to the aspects of the case in order to put the evidence in shape so that your local attorney, should the case be referred to him, may have the fullest and best evidence in his possession; fourth, investigation to procure such evidence as may be finally used as a last resort in matters of litigation. Securing evidence must always be regarded as a matter of careful consideration. For when you have the evidence secured, the question is constantly coming up, what sort of a witness will this man make, and how will the evidence strike the jury.

"In making investigations for these purposes, I have found photographic data and facts to be of very material value, because the evidence of the camera is truthful and reliable, and the most difficult to attack or overcome.

"Again, photographs of the wrecked train will very often give you pictures of persons who are about the wreck—passengers and outsiders who came to the wreck. These photographs will often give you pictures of persons who afterwards claim to have been injured, and of persons who were on the car with them, who sat near them at the time of the wreck, and of persons who stood near or aided them. From these persons evidence may often be obtained as to the condition of the parties

who claim to have been severely injured, showing that what they claim is largely untrue. In cases of accident to passenger trains, in my experience I have found it valuable to show the condition of the cars and the condition of the passengers, and the situation in detail as fully as possible. I try to get the exact location of outside persons who may be valuable as witnesses to give evidence as to the details of the wreck and the condition of the passengers, aside from what is shown in the photograph.

"For the purpose of showing the condition of claimants in after days, it is also valuable. I have had cases referred to me of claims made by persons injured, who claimed to have been incapacitated for labor, or, in other words, permanently injured. Where I have had doubts of the truthfulness of the claim, I have had some trustworthy men watch the claimant, and obtain a picture of him in the act of doing that which he claimed he was unable to do. One instance is woman who claimed to be injured so as to have lost the use of her arms almost entirely. By placing a young man in position to overlook her back yard, he got a good picture of the lady in the act of hanging up clothes, which she claimed was impossible for her to do. It is needless to say that with that picture in our possession it was a valuable assistant in the settlement of that claim. In many cases of this character you will find the photograph of great value in getting at the true facts.

"Then, again, the photographs are valuable as keeping a record of things in the past. Witnesses die, and their evidence is often lost. The picture can be preserved and cannot be impeached. I have found the pictures valuable for giving information of the condition of things in the past. Of crossings, bridges, stations, tracks, etc., where changes had been made, and it was desired to know just what the condition was at a time before the change was made.

"Considering the character of the evidence secured, and the advantage in cost of time and expense of securing it, and the convenience of handling and using it, I am convinced that the kodak is of great value to the claim agent in the settlement of claims."

While Mr. Pierce has looked at the subject entirely from a steam road standpoint, our readers will notice many advantages with reference thereto that will appeal to them in their own particular field. Street railway claim agents get to the scene of an accident a short time after it occurs, before those who are injured are removed. A photograph taken at that time will show not only claimants' witnesses, but everybody around the wreck, if it be a wreck, and can be used to suggest questions in cross examination and rebuttal. The value of the camera is particularly shown in the instance of the woman who was hanging clothes, for it was a complete impeachment of her testimony. The expense of a camera is small, being only a small per cent of a nominal settlement of a single case. It does not require much skill to operate it, and with each exposure the operator becomes more accomplished in its use.

TO INCREASE SEATING CAPACITY.

Some genius hit upon a plan to increase the seating capacity of motor cars in large cities, and thought he had a fortune in sight. He had been in dry goods stores where they have stools at the counters. He had been in theatres when it was necessary to bring in chairs. In thinking it over, he concluded a combination of the two plans would certainly solve all problems.

Minor officials of a company were induced to try the plan in one car. Each seat consists of an iron post with circular upholstered top, little less than a foot in diameter. When not in use the top may be turned up in a vertical position, so that it will not interfere with the movements of passengers. The seats are only intended for use when the cars are crowded.

"I'll have four yards of crepe du chine," said a married man, as he carefully balanced himself on one of the pedestals, Monday morning.

"Murder! Get out of here, you horrid thing!" exclaimed a rosy-cheeked young lady, when she discovered the man on her lap, a moment later. He had managed by great exertion to keep his seat for two blocks, but a sudden jolt of the car was too much for him.

"I beg your pardon, I did the very best I could to prevent it," he assured her with great earnestness, but he did not look as if he were a bit sorry.

A young woman with a gray cape and a winning smile thought it was great fun to perch on one of the new seats. The car started suddenly and she landed in close proximity to a passenger who was a man and a perfect stranger. She blushed furiously and stammered an explanation, but he only smiled and assured her that she

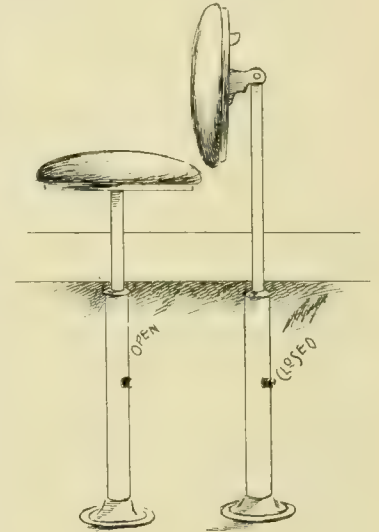


had committed no offense. The seats are not particularly restful, but they are welcomed by many passengers as a relief from the tortures of "standing room only."

The first car had not been in service 20 minutes before the passengers had devised plans for accommodating about 20 more in the car, aside from the standing

room. A little man with bushy whiskers had a scheme perfected before going a block.

"The thing to do," he declared, "is to place a row of hooks under the ventilators and hang up the passengers like quarters of beef in a meat market. They could weave back and forth as easily as they do at present when suspended from the straps. The advantage of the hook scheme would be that there would be more freedom and poetry of motion and it would not be so hard on corns. The gentle swaying would be restful and men would not get to their places of business feeling as if they had performed a day's work. On the

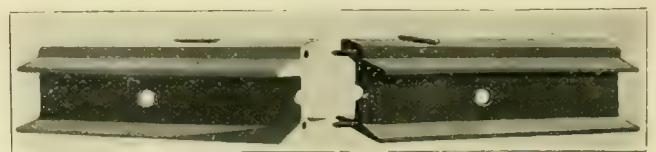


lines used by the officers of the company a hammock might swing from the ceiling of each car for their benefit."

"Yes, and when the weather gets nice and warm," chimed in another passenger, "it might be well to have rows of hooks on the outside of the cars and seats on the roofs." The seats have been removed.

A RADICAL MOVE IN TRACK BONDING.

In a communication to the February transactions of the American Institute of Electrical Engineers, George P. Low, of San Francisco, describes a bonding system devised by F. T. Newberry, a civil engineer of the Pacific coast. It is termed "direct bonding," and the bond consists simply of a copper dowel pin that is shrunk fit into holes drilled into the abutting rail ends. Two or more are used at a joint. The holes are bored



just before placing the rails. The ends are heated with a gasoline torch. The dowel pins are driven in the end of one rail, and the abutting rail is forced over the other end of the dowel. With $\frac{5}{16}$ -inch pins in 70-pound rails, the carrying capacity of two pins would be one-half that of the rail. The bond is protected thoroughly, and its connecting surface is seven times its cross section. The number of bonds used to a joint can of course be increased with a corresponding increase in carrying capacity. The shrunk fit secured, is said to be very tight, and if the bond is not injured by a slight lateral movement of the rail ends, it ought to be very efficient.

ELECTRIC SUBWAY IN BOSTON.

The problem of rapid transit in Boston, Mass., is confidently believed by the citizens of the "hub" to have been solved by the Subway Commission, which recently submitted its report.

The plans of the commission provide for a subway fourteen feet high from the top of the rail to the roof, and twenty-four feet wide for double track. In its construction steel will be used to a great extent. Instead of the old style of heavy masonry construction the commission has adopted steel columns as walls and supports and steel girders, covered with concrete, as the roof. The flat roof and perpendicular side walls economize space and make it possible to bring the subway close up to the street surface. Passengers will have only sixteen feet of stairway to climb in ascending to the street.

On busy streets the cars will run in the subways; on other streets the lines will be continued on the surface.

At first only two tracks will be laid in the subway on Tremont street, but space will be allowed for two additional tracks. This will be the first to be constructed. From the main line on Tremont street branches will be built under Boylston and Charles streets.

Ventilation will be effected by fans between stations. These fans will draw the air in at the stations and exhaust through special openings at the side.

The lighting of the subway will be by electricity. The lighting installation will be separate from the power plant, which is to furnish current for the motors and car lights.

Drains will be laid at the bottom of the subway with a gradual fall to the lowest points, where pumps operated by electric motors will elevate the water to the public sewers.

TERRA COTTA FOR FILLERS.

Brick and wood have had a monopoly of the filler business for several years past but a new competitor has appeared in the shape of a terra cotta filler for paving to



girder rails. The Brooklyn City Railway has done some paving with this material for fillers. The blocks were made to the order of the Brooklyn City Railway by the Lorillard Brick Works Company of New York. The section of the block used is clearly shown by the engraving. The length of the blocks is one foot. They are similar to those employed around the iron

girder work of our modern office buildings. The saving in weight over solid brick fillers makes cheaper transportation per mile of fillers required.

HANDLING SCHOOL CHILDREN'S FARES.

Although two halves make a whole, street railway companies find it annoying to gather the fractions. Many good methods have been devised for handling children's fares, some of which have been given publicity in these columns. One of the neatest plans of keeping track of school children's fares has been devised by E. J. Whipple, cashier of the Saginaw Consolidated Street Railway Company, Saginaw, Mich.

By ordinance the company is required to place on sale

SAGINAW CONSOLIDATED STREET RAILWAY.	
This will introduce to you	
.....	
a Pupil in my School, who is a regular attendant.	
.....	Teacher
.....	School,
Saginaw, Mich., 189 ..
<p align="center">NOTICE.</p> <p align="center">This Permit is issued as an Identification Card, and must be carried by Pupils using School Tickets.</p>	

<p>SAGINAW CONSOLIDATED STREET RAILWAY.</p> <p>SCHOOL TICKET PERMIT.</p> <p>NOT TRANSFERABLE.</p>
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special tickets for school children. The tickets are green; on one side is the name of the company, and on the other, the words "special school." Wishing to place the tickets in proper hands, Mr. Whipple designed a small envelope. The envelope not only holds the ticket, but serves as an identification card, the name of the ticket holder being on the pocket as well as recorded in the office. Should an accident occur to the holder of the ticket, it will also serve as a handy reference. The plan is working with a great deal of satisfaction. The large illustration shows the actual size of the envelope when open, the smaller the actual size when closed. The outside of the pocket is the section on which the "notice" appears.

The town where somebody is not complaining of street car management, is not down on the maps. Even with flying machines perched on every housetop, people would kick because there would be no time to rest between getting on and off.

A STREET INDICATOR.

Henry C. Beekman and Jacob Stocke, of St. Louis, are the possessors of some simple patents on car indica-

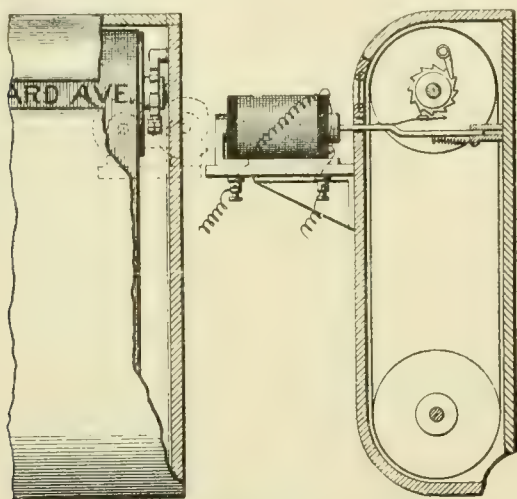


FIG. 1.

tors. The indicator cylinder is operated by a ratchet and electro magnet as shown in Figure 1. The electro

magnet is worked by the trolley current and for this purpose an insulated wire is run from the indicator up the trolley pole and connected to a rod which projects out on each side of the pole where it makes contact at proper intervals

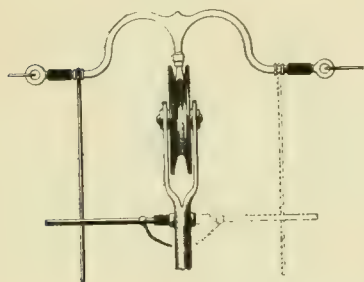


FIG. 2.

with rods hanging from a double pull off hanger as shown in Figure 2. The combination is simple and positive in action.

SUGGESTIONS FOR TROLLEY PARTY.

If it is possible to create a fad there is money in it, if the creator is a street railway company. Only set the fashion and the results will come up to expectations. Development of summer resorts creates the fad of riding to them on the cars of the company. The trolley party fad is a good one to stimulate, which can be done by suggesting novel features to persons able to act on them, advertise them, so that they do not appear to be advertised, and the faddists will fall in line.

In New Haven, Conn., is the East and West Side Trolley Club, which is a social organization having frequent meetings. Not long ago a Lady Washington party was given. A car of the New Haven Street Railway Company was handsomely decorated. Each window had a lace curtain, draped laces with red, white and blue rosettes, while the ceiling was hidden by red, white and blue bunting, and on the outside of the car was more bunting with two large shields. Portraits of George and Lady Washington, framed in red, were inside the car,

and over one door was a hatchet. The ladies wore old-fashioned gowns, each different, and powdered their hair, their escorts being attired in knickerbockers, long coats, silk stockings, shoes with fancy buckles, and silk hats with bands the shade of the gowns worn by their respective ladies. The motorman and conductor had high hats with red, white and blue bands. Dancing was the amusement at the stopping place.

Suggestions of similar novelties to society folk will keep the special party car busy, after the movement is once started.

NO GENTLEMEN IN THE CAR.

Every seat was occupied. The middle-aged woman who had just entered the car may have been composed of thin air for all the attention she attracted from the three congressmen who remained seated. They only became more than ever absorbed in their newspapers. Not so the man who was in a state of partial collapse from drinking too much wine. He said aloud:

"Any gelman wil-hic-willing to hic-gi-give a lady a seat?"

The three congressmen turned red in the face and raised their papers higher. A boy snickered, so did the men on the straps. The women with seats smiled and the one standing blushed, then appreciating the situation, smiled too. The bibulous passenger closed his eyes, but not for long. When the car stopped at the next corner to let a man off he broke out again:

"Any gelman wil-hic-willing to hic-gi-give a lady a seat?"

The three statesmen turned redder than before. The boy snickered again, the strappers grinned, and the standing woman bit her lip and looked out of the window. The bibulous passenger once more closed his eyes. Two streets further and the boy got off the car. The standing woman took his seat. The tipsy individual opened his eyes again, and seeing the woman comfortably seated, beamed round on his fellow passengers, and with a joyous what'll-you-have smile, remarked:

"Share wus gelman willing to-hic-give lady seat. Hic-ray!"

John A. Roebling & Sons Company received contracts for eighteen miles of trolley wire and thirty-two miles of 0000 feeder wire for the Cleveland & Elyria Electric Railroad, and trolley wire for the Akron, Bedford & Cleveland Railroad.

The Elwood Electric Street Railway Company, of Elwood, Ind., has rebuilt its power house which was destroyed by an explosion some time ago. The new equipment includes two 500-horse-power water tube safety boilers, made by the Stirling Company, of Chicago, and guaranteed not to explode; and a 300-horse-power Russell engine. New car bodies have been bought of the Barney & Smith Car Company, Dayton, O., with which are used General Electric equipments.

LESSONS IN REVENUE GETTING FROM SEATTLE.

The report of M. F. Backus, receiver of the Seattle Consolidated Street Railway for 1894, will furnish food for reflection to those who do not believe that it pays to "bother with" the many possible sources of auxiliary revenue that are open to street railway companies.

While the revenue from outside sources is small as compared to the passenger business it helps out the net receipts very materially and will continue to increase as time goes on. In view of the fact that it requires so little additional investment to cultivate other than the regular passenger business it is inexcusable to neglect other means of income where they are at all available. The report also shows the importance of properly inspecting motors.

The receipts and expenditures are as follows:

RECEIPTS.		
	1894.	1893.
Passenger.....	\$76,937 80	\$98,120 84
Power.....	8,058 10	7,041 31
Freight.....	3,340 16	1,137 87
Other sources.....	3,080 07	1,709 73
Total gross earnings.....	\$91,416 13	\$108,009 75
EXPENSES.		
Salaries.....	\$ 4,826 53	\$ 5,528 86
Car service.....	33,712 95	42,539 38
Car repairs.....	8,878 12	13,318 68
Motive power.....	10,491 51	13,705 04
Track repairs.....	6,443 03	7,995 64
Sundries.....	10,102 70	6,343 60
Total operating expenses.....	\$74,454 84	\$89,432 20
Taxes, insurance and other charges.....	7,153 35	7,166 95
Total expenses.....	\$81,608 19	\$96,599 15
Total gross earnings.....	\$91,416 13	\$108,009 75
Total expenses.....	81,608 19	96,599 15
Net earnings.....	\$ 9,807 94	\$11,410 60

The receiver continues: "These comparative statements show that the ratio of operating expenses to gross earnings for 1894 was 81 4-10 per cent, as compared with 82 8-10 per cent for 1893. They also show that while passenger receipts declined \$21,823.04, the net loss in income was only \$1,302.66. This large saving in net results was accomplished by the most rigid curtailment of expenses and by building up other sources of income, as will be seen by comparison of the items of power, freight and other sources under the head of receipts, and of car service, car repairs and motive power, under the head of expenses. The great difference in the item of car repairs, which is 33 1/3 per cent less than the same item in 1893, and nearly 57 per cent less than the same item in 1892, is due chiefly to better care of cars and to thoroughly testing all motors before allowing them to go into service. Prior to 1893 no test whatever was made and a large number of motors were run when entirely unfit for service. And still further reduction in this item during 1895 is anticipated, as a considerable proportion of this expense in 1894 was due to improvement in the motors, wiring and trucks. On the other hand it will be

noticed that the entire reduction in the receipts is in the items of passenger fares, and that all other sources of income show an increase."

CONCERNING GRADE CROSSINGS.

Street railways always get the worst of it in cases of grade crossings. It is the street car that must look out for itself, not the steam car. All safety appliances must be put in by the street railway, while the steam road goes right along, as if there were no crossing in existence. A correspondent makes a suggestion which deserves attention, advocating signals requiring engineers of steam roads to slow down when approaching crossings. The communication follows:

Andover, Mass., March 18, 1895.

Editor REVIEW—Your issue of the present month contains a short article entitled "Concerning Grade Crossings." It is an attempt to analyze if not criticise the present condition of the practices and to some extent the laws governing the crossing of steam roads at grade by electrics, a practice which is now being made use of owing to its dangerous features, by the steam roads, eliminating so far as they can these dangerous features, but as a reason why electrics should not under any circumstances cross their tracks at grade, which in other words means why they should be relieved from such a competitor for by the peculiarity of the layout of many towns and cities to prevent the crossing is to prevent the competition.

Now I believe the dangerous element to a large extent may be eliminated in the following manner:

It is a law of our state, Massachusetts, that every street car shall stop within 100 feet of all steam tracks before crossing (P. S., Mass. 113, sec. 41) and an unwritten law, incorporated into the rules of almost every company that the conductor of the car shall go ahead and signal as to the track being clear.

Now, why should not signals be placed along the steam road, both a distance and a home signal, these to warn the engineer of danger at the crossing, that he may have his train under easy control. These signals to be operated by the conductor of the electric when he goes ahead to see if the way is clear, and after his car has passed, drop the signal and board his car.

I can see no objection to this for no one is put to any extra expense (except the first cost, which would be slight) the conductor losing no time, as the present practice is for him to stand and wait for his car. There should be no interference with the running of the steam trains except in case of danger, which is its intended purpose.

The advantages are so very obvious in such cases, as the trolley coming off or power giving out, that I deem it unnecessary to mention them, sufficient to say that I have wondered at this practice not having been recommended by some of the Railroad Commissioners in their several reports, for it is only resorting to what has been considered the only safe method in steam crossings at grade. I

think that that horrible night mare which some times rides us, who have to do with these crossings, might assume a less fearful shape were the above the practice.

W. G. CLEMONS.

MELBOURNE, AUSTRALIA, CABLE SYSTEM.

Melbourne, Australia, with the most extensive cable system in the world, has a municipal and interurban system of street railways, which were built and owned by a commission elected annually by the municipalities through which they run, and leased to the Melbourne Streetway & Bus Company. Cable lines, similar to those of America were built for the main system, which is straight, while suburban lines on account of the many curves, are worked by horses. The total outlay was about \$8,000,000, a large part of the cost being due to changing water mains and other underground work.

Yokes made of 50-pound steel rails are set at $3\frac{1}{2}$ feet intervals, with brackets every 30 feet to support the pulleys. The slot is $\frac{7}{8}$ -inch wide. Rails on the main line weigh $87\frac{1}{2}$ pounds per yard and on the suburban lines $67\frac{1}{2}$ pounds, the gage being 4 feet $8\frac{1}{2}$ inches. Red gum blocks are used for paving, the company being obliged to pave 18 inches outside the tracks. The blocks are laid in 6 inches of concrete. Considerable trouble was caused by the swelling of the blocks, which nearly closed the slots at times. The difficulty was overcome by a longitudinal elastic joint of "animal pitch," refuse from candle works, placed between each pair of rails.

The cement was required to stand a tensile strength of 350 pounds per square inch, on blocks soaked in water seven days. The average of the tests was 445 pounds, and of 140,000 casks of cement received, only 4,000 were rejected.

In order to avoid delays in case of break downs, only local manufacturers were permitted to bid on engines and boilers. There are six pairs of horizontal high pressure engines with 20-inch cylinders 3 feet 4 inches stroke,

in diameter, constructed of $\frac{3}{8}$ -inch steel plates, 49 tubes $3\frac{1}{4}$ inches diameter. The steam dome is 8 feet long, 2 feet 4 inches diameter.

The illustrations show the interior of the power house,



POWER HOUSE.

and a usual train. The latter does not differ much in appearance from the grip and trailer used in America, looking as if it might have been supplied by almost any cable line.

BERLIN'S STREET RAILWAYS.

It is the fashion for those who oppose American street railway systems and practices to point to the European systems as examples of the perfect in street railway operations. The fact is, European systems have much to learn from American systems, while the latter can obtain nothing new by studying the out of date methods on the other side. In most European cities the cab system is excellent; but the street railway systems do not compare with those in America for length of lines or accommodations for the public. Count Wolf von Schierbrand, who was a Chicago newspaper man for many years, has recently returned to Berlin, and has written concerning the Berlin system of intramural transit. He says:

"Among those things which, according to an American standard, are still lacking to make Berlin a metropolis in the full sense of the word, more rapid intramural transportation stands at the head. It is true that the present means of locomotion are more ample and diversified than is the case in either Paris or Vienna. But, then, Berlin prides herself on her go-ahead spirit and looks with a fine admixture of scornful pity upon those other great cities of the European continent, accusing them of being slower and less progressive in every respect. It is true that Berlin's fiacre (here called droschke) is both cheaper and faster than its Parisian rival, and it needs to be seen in order to be believed that a ride in a second-class droschke (good enough for all practical purposes) for one or two passengers costs but the trifling sum of fifteen cents. Those a grade higher charge but ten cents more—and, mind you, they make money at these rates. There are about 30,000 of them in use now, and every one of them is in reasonable demand every day, due in large measure to the excellent police regulations which oblige cab drivers to wait at and to return always to a certain public stand, of which about 5,000 are scattered throughout the town, wherever the public is likely to want vehicles, so that at any time, day or night, a man has but to walk a block or so to find a



GRIP CAR WITH TRAILER.

with fly wheel 13 feet in diameter to each pair of engines. The engines develop 750-horse-power a pair, working 60 revolutions a minute under 100 pounds pressure. The cost was about \$25,000.

The order for the twenty multitubular boilers was distributed among four firms. Each boiler is 15 feet $4\frac{1}{2}$ inches long, exclusive of smoke box, and 7 feet $4\frac{1}{2}$ inches

droschke. But when it comes to the cheaper and still more popular means of locomotion, street cars, suburban steam cars, 'busses, etc., Berlin isn't "in it" when compared with London, New York or Chicago. To reach a point two English miles from your home it is often necessary to change cars, requiring two fares, and one has to walk some and then wait some minutes at the stopping places (indicated by an iron pillar with sign affixed) and reaches one's point of destination not sooner than within thirty to forty minutes."

A TRAGEDY.

CHAPTER I.

The young man who sat in the window of the eighteenth story of the Masonic Temple balanced himself neatly on the window ledge, and surveyed the eddying noonday throng beneath him. There was an air of elegance and equilibrium about him that bespoke the man of leisure and refinement.

Suddenly he heard the wild shriek of a policeman's whistle down the street, and, with a sudden movement, turned to see a fire engine rushing up the crowded thoroughfare.

A second later a cry of horror arose from the street.

In his eagerness the young man had lost his balance and was falling with lightning speed to the street below.

CHAPTER II.

The faces of the thousands who saw the frightful leap were pale with terror as the young man's body, striking a projecting corner in its flight, bounded far out towards the street.

Strong men wept, and women turned their blanched faces aside.

With a horrible thud the falling figure reached the granite pavement in the middle of the road.

CHAPTER III.

But the thousands who rushed forward to see if a spark of life remained in the prostrate figure were suddenly held back.

The fire engine, with maddened steeds and heavy rumbling wheels, was close at hand.

In vain the frightened driver tried to check the headlong rush of the engine.

As well might he have tried to stop the ball at the cannon's mouth.

Almost before the crowd could know what had occurred, the flying engine had reached the prostrate form and passed over it.

CHAPTER IV.

Save for the low sobs of some anguished women, and the muffled exclamations of horror from the men, the crowd was completely hushed.

Two of the bravest men in the awed assemblage sprang forward, together with a stout policeman, and stood above the form of the young man.

The policeman turned away with a sad face and started for the ambulance.

But ere he had taken two steps the figure on the roadway straightened out, and the young man rose, dusted his clothes lightly with his handkerchief, and started to walk away.

"Hold on," said the officer; "you're injured."

"I think not," replied the young man, as he airily lighted a cigarette; "I'm a football player!"

LOCATION OF CAR FENDERS.

A writer in a New York daily, in solving the fender problem, sets forth that the car body should be sufficiently elevated to allow a person lying upon the track to escape contact with it. That as there is usually several feet from forward wheels to front end of car, the driver would have six or seven feet additional space in which to stop the car before the wheels reached the fallen person. He would place a guard close in front of wheels carried very close to track and employ belgian block or asphalt in order to secure the true, smooth surface necessary to make the low running fender clear the ground. The writer also says:

"An ideal condition of roadbed, car and safety device would be, first, and principally, a smooth surface road, a car body sufficiently elevated, and a wheel guard attached rigidly to and in front of and entirely around the trucks, reaching within one and a half inches of the ground, allowing that space for the oscillation of the car truck. This means a complete inclosure of the wheel system, and, with a life-saving guard at the forward end of the truck running freely over a uniform roadbed, would positively discount liability of accident."

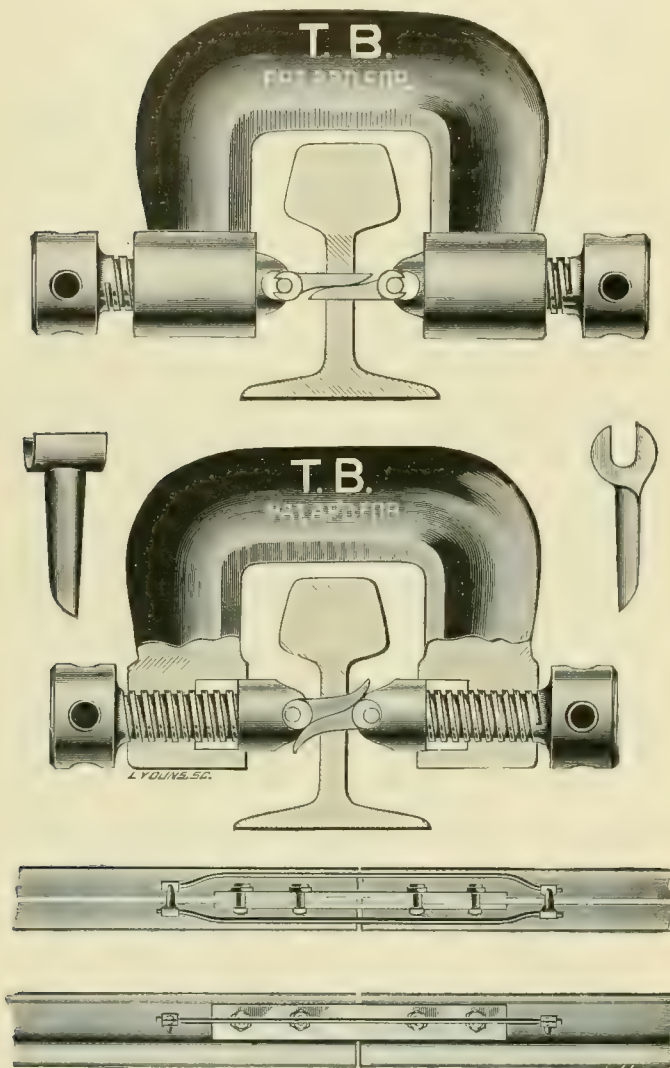
Certainly a fender that will "fend" is one of the things that is surely coming, where it has not already been introduced, and managers must study the question carefully, as they will soon have to face it, either of their own free will or by ordinance. The elevation of the car body, however, would doubtless be generally considered a great objection making entry and exit slower and more difficult, while the steps would still hang as low as the generality of car bodies at present.

LOOK OUT FOR OLD OIL BARRELS.

It may be economy to use old oil barrels for other purposes, but great care must be taken or an explosion may occur which will cause more damage than new barrels would cost. The importance of carefully cleaning old oil barrels before putting other substances in them is shown by an accident at the Westinghouse Electric Works, Brinton, Pa. Castings were stored in an old barrel, which had contained wood alcohol and been reheaded. One of the workmen lighted a match to see what was in the barrel, and the gas which had generated, was exploded, throwing the castings in various directions, killing one man, wounding five others, and injuring the building.

SELF-LOCKING RAIL BOND.

Many styles of rail bond are on the market, all of them endeavoring to make a better return than can be secured without their use. One of the latest is made of bronze, one end being in the form of a groove which contains the return wire. A $\frac{9}{16}$ inch hole is drilled through the rail into which are forced from opposite sides the stems



of the bond which project from the under side of the groove at right angles, flat on one side and round on the other, being tapered to a feather edge, filling the hole when in place, as the pointed ends slide by each other. Each groove is about $1\frac{1}{2}$ inches long, and after the wires have been laid therein, a small machine is attached as shown in the illustrations, and by means of powerful screws, nuts and levers, forces the lips of the groove over the wire, holding it firmly. Simultaneously the stems are forced into position and clinched so strongly that the manufacturers say it is impossible to loosen the wire or the bond, and requiring them to be cut out to be removed. The time required to place this self-locking bond in position is said to be exceedingly short, almost instantaneous. The manufacturers, the Thompson-Brown

Electric Company, Boston, report a large demand for the T.-B. self-locking rail bond, which is found in practice to exceed the claims made of its utility.

PHOENIX INSULATING PAINT.

A representative of the STREET RAILWAY REVIEW had the pleasure of being present at some tests of a new insulating paint, made recently in this city, by Elmer Morris of Morris & MacCurdy, Indianapolis. The paint has been named "Phoenix" by that firm on account of its fireproof qualities, and after seeing the test we consider it rightly named. The paint is claimed to be pure asphalt, and the process of manufacture consists simply of a method of refining asphalt so as to get it in a purer state than it has been before possible to obtain it. It is said that only the impurities in asphalt will burn, hence the fireproof qualities of the paint. A thick coat of this paint on an iron surface was subjected to the continuous heat of a gasoline torch and showed absolutely no traces of injury until the iron had been red hot for some time. The paint is jet black and makes a splendid smooth surface. An inflammable solvent is used to make the paint flow, but after a few hours this dries out, and the fireproof body of the paint is left. Electricians will at once recognize its value for field and armature winding, the painting of cut out boxes, switches, and in fact, all electrical work.



HAD A SAFETY TROLLEY WIRE.

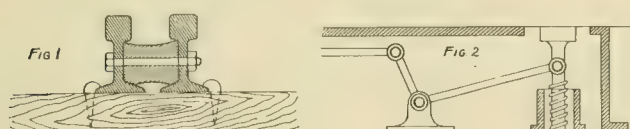
Vincent A. Strawson was in the Raymond street jail, Brooklyn, on a warrant against his person to satisfy a judgment for \$212.21 in favor of George J. Tucker. Mr. Tucker in 1893 was induced by Strawson to invest in his safety trolley wire company, which was to be organized with \$200,000 capital. A working model was shown him, and he was told a prominent street railway president had offered \$100,000 for the exclusive right to use the wire. Strawson, it is said, told Tucker there was millions in the patent. He put in \$300, but six months went by with no steps taken to organize the company. Tucker demanded the return of his money, and Strawson told him he was foolish to ask for it, and even though the company had not been able to organize, there was a chance for him to make plenty of money. The result is the suit and judgment.

The Union Brass Manufacturing Company, 123 Ontario street, Chicago, which succeeded the Mosher Electric Company, had a sign on its door reading, "Jim Pease has got us." Mr. Pease is sheriff of Cook county.

STEAM STREET RAILWAYS IN ITALY.

During the past fifteen years the suburban street railways in the larger Italian cities have been extended to such great distances as to form a perfect network. Originally, local horse lines carrying passengers, they have become interurban steam lines, carrying both passengers and freight. While undergoing so radical a change in both motive power and functions, the suburban railways have retained the character of street railways, that is, they continue to operate on the public highways, and at limited speed.

A more substantial construction of the permanent way is now the rule, owing to the heavy traffic and steam motors. T rail, weighing 36 to 42 pounds to the yard, has replaced the old style, the majority of the companies having adopted a steel rail of the vignoles type, a cross-section of which is shown in Fig. 1. The section A weighs 36 pounds, and section B, 42 pounds to the yard. On curves of less than 165 feet radius, guard rails are



used almost invariably. As shown in Fig. 1, these consist of two ordinary rails bolted together with a filler between. The rails are spiked to ties of oak, a timber which is abundant in Italy.

Switches are generally worked by levers and counterweights, but in towns where such an obstruction cannot be permitted in the open street, the arrangement shown in Fig. 2 is adopted. The lever operating the switch is contained in a cast-iron box imbedded in the street, with its cover flush with the pavement. The foot plate, A, Fig. 2, sinks when stepped upon, moving the points of the switch. A spring underneath returns the plate to its normal position.

Curves have a radius of 55 yards, as a rule, although there are some of 20 and 40 yards. On the sharper curves, the gage is slightly eased, and as the rigid wheel base is only 5 feet 3 inches from axle to axle, the cars and locomotives readily pass.

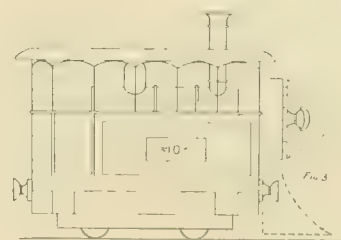
Gradients are very steep in some localities, but in only one place has resort been had to rack rail.

Single track forms nearly the entire mileage, double track occurring only on trunk lines used by different branches. The turn-outs are 360 feet in length, giving 200 feet clear track. Stations for the sale of tickets are usually located at the more important stopping places in houses adjoining the track. In sparsely inhabited districts, a signboard with the inscription "Stopping Place," indicates where passengers may await the train.

The type of locomotive in common use is shown in Fig. 3. The government regulations provide that the working parts of the engine must be encased so as to be hidden from view, and that every engine must be equipped with brakes of known power. A steam pressure of

176 pounds to the square inch is the highest allowed. Cylinders in the usual type of 12 and 14 ton engines have a bore of 10 inches. Driving wheels vary in diameter from 1 foot 11 inches to 2 feet 2 1/4 inches. Welsh

coal is burned, and spark arresters are fitted in the stack. The dotted lines in Fig. 3 show the plow, which in winter clears away the snow, for it is not unusual, even in sunny Italy, to have an 18-inch fall of snow.



Passenger cars are designed to carry 32 persons, first-class; or 40 persons second-class. One compartment is commonly reserved for baggage. Open cars with rustic seats are proving very popular during the summer season. The ordinary closed car weighs 3 to 3 1/2 tons, and the open car one ton less. All passenger cars are equipped with brakes, operated by hand, continuous and air brakes being rare. Automatic couplings have recently come into use on some lines.

Freight cars resemble those of the steam railways. Their capacity ranges from 6 to 8 tons, and their weight from 2 1/2 to 3 1/2 tons for flat cars and from 3 1/2 to 4 1/2 tons for box cars. With most lines, the income from the freight traffic is considerable. In some districts goods can be conveyed without transfer for 100 miles; as from the province of Pavia to Mantua or Brescia. The interchange of cars from one line to another, is greatly facilitated by the almost general adoption of the standard Italian railway gage of 4 feet 8 1/2 inches.

The freight traffic has been developed of late years to a remarkable extent. Very many sidings branch off from the public highway into private property, affording direct communication with farms, fruit gardens, dairies, mills, factories, ironworks, brickworks, limekilns, quarries and mines. The cars are loaded on the spot and run without rehandling, direct to the point of distribution, while the materials shipped from city to the works are moved in the same manner at a minimum expense. At Turin, for example, brick are received from the large yards at Beinasco in the original crates in which they were stacked in the field. A crane loads and unloads the crates on and off the flat cars.

The removal of faecal matter from the city to sewage farms is another function of the interurban steam railway, which has been turned to account at Vinovo, near Turin. In the city, the faecal matter is collected in iron tanks on ordinary carts, which are transferred by a crane to flat cars at the station. Thence the loaded cars are run to the various farms, where the matter is discharged into tanks, as shown in

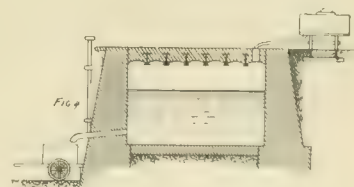


Fig. 4. From this tank the liquid matter is distributed over the farm by means of tank carts. The engraving shows a cart in position to receive a load.

From the foregoing, it will be seen that Italy is several years in advance of the United States in the development of suburban and interurban street railways for other than passenger traffic. With the advent of the electric railway, however, beginnings have been made in several cities of the Union, notably at Spokane, Wash., Rockland, Me., Hornellsville, N. Y., McKeesport, Pa., and Frankfort, Ky.

FOR A LEISURE MOMENT.

A good story is told on J. R. Stirling, well known as the secretary of the Citizen's road in Detroit, for several years past, and now head of the supply house of Stirling, Grant & Co., of that city. When John arrived at the advanced age of fourteen, school duties seemed to wear upon his ambitious nature, and finally in a fit of desperation, his father consented to his taking a position in the paternal office. At that time the Stirling Senior was operating several immense lumber camps in northern Michigan, and as fall approached, it became necessary to lay in the winter's supply for several hundred men. When navigation closed all visible means of connection with the outer world ceased for the succeeding five months, hence the supplies were not only varied but numerous. As it was inconvenient to send anyone else and as John was to learn the ropes, his father concluded then was a good time to begin, and gave him letters to the leading wholesale houses in Detroit, introducing his son John, whose purchases were to be honored, and for which the paternal bank check was vouchsafed. John went fortified with a list of goods needed. On reaching Detroit the wholesalers met John with a deference and dignity which was simply delightful, and he speedily became convinced that the old man's list of things needed would not last a month. So where five barrels of molasses were scheduled John made it fifteen, and so on through all the list. When the purchases were all made it was necessary to charter a schooner to transport the cargo. This John did and in due time hove into port with a stock of supplies sufficient to last the camps four or five years. John settled with his father and the father with the wholesalers, and John wished he had remained in school. However a big storehouse was erected and the supplies stowed away while the men thought the "old man" had gone crazy, and the old man thought he had gone "bust."

The sequel, however, is the most interesting part of the story, for in the spring the war broke out and these same supplies were shortly enhanced in value several times, and when sold a few months later realized a profit of a good many thousand dollars. To this day, however, John says he don't know whatever would have become of them if it hadn't been for that war.

The genial "little giant," George B. Kerper, of Cincinnati, known as one of the leading street railway men of the country, and ex-president of the American Street Railway Association, is an habitual practical joker, as the fraternity well know. At conventions he is the life of things, and always has an interested crowd of listeners. We recently met a tourist who was in France during Mr. Kerper's European tour, and witnessed Sir George's departure from a hotel. Now Mr. Kerper is generous to a fault, and according to American principles tipped every employe in the hotel until they had each earned a month's pay during the four days sojourn. When he came to leave, the entire force, male and female, from chief clerk down to boots were ranked in file on each side of the walk reaching from the front door clear to the curb, and every one with right hand extended for the final tip.

A broad Cincinnati smile overspread his face as he emerged and beheld the demonstration. Transferring his bundles to the left hand, and with family following close behind, Sir George advanced and with great dignity shook hands with each astounded servant, wished them all "good bye" told them Cincinnati was a larger city than Paris, and to never forget him, and at the end vanished in the cab.

At last accounts the double file, paralyzed, were still standing with outstretched hands, wondering what had happened.

Some time ago, it might have been two months or it may have been two years, a contract was about to be let for some engines for a power station. For ten days the boys had swarmed in from far and near with expensive tracings and figures which had cost a pile of money. The director's room was a foot deep with the blue prints and all hands were as far from the end as on the first day. Last of all came a salesman who thought himself so belated as to stand no chance whatever. Hieing himself to the seat of war he beheld the carnage of blue prints and at once sized up the desperate condition of his chances. Presenting himself to the board, he begged until the next morning in which to get his "papers" on from the east and suggested he had something they had not seen at all. The time being granted he rushed out and hired two of the best draughtsmen in the city. All that day and all that night they toiled at the oars, and not until nine the following day was the work completed. Then a frame and glass was purchased and our hero presented himself once more to the aforesaid board. The board were weary, almost unto death, and settled hopelessly back for the usual story. Imagine their surprise when the cover was removed, they beheld a many colored picture of the engine room, with steam pipes, dynamos, and engine complete, drawn according to their own plans, and showing exactly how the plant would appear with the engines installed.

In half an hour the contract was signed and the country saved; but it was a close call.

VESTIBULES INJURED HIS HEALTH.

Without investigating them, most people are inclined to the opinion that all closed cars should be provided with vestibules. Evidence was presented to the senate corporations committee of the Colorado legislature, showing that vestibules do not do what is expected of them. A man named Newman, who had been employed as a motorman in Minneapolis, testified that the vestibules of street cars were a positive menace to health, and that he had been compelled to seek the milder climate of Colorado on account of the work of operating a vestibuled car having undermined his health. He said:

"In fair weather the glass front of the vestibule is closed and the motorman is warmed. When a snow begins to fall, the windows will become so obscured that it will become necessary for him to drop the front window. This at once chills him, both by the sudden change of temperature and the concentration of draught."

Other motormen, who have had experience with vestibules, will corroborate Mr. Newman's testimony. Nature has a way of clouding window glass on cold days, which makes it absolutely necessary to open the window in order to see out of doors. The cold air, being constantly forced into a small space, makes it far more uncomfortable for the motorman than if it has a chance to get by him, as it does when there is no vestibule. In cold weather some passengers prefer to ride on a platform than to be inside of a car which is not heated, because it is more comfortable outside. The vestibule is even colder than an unheated car.

EXPRESS SERVICE ON ENGLISH TRAMS.

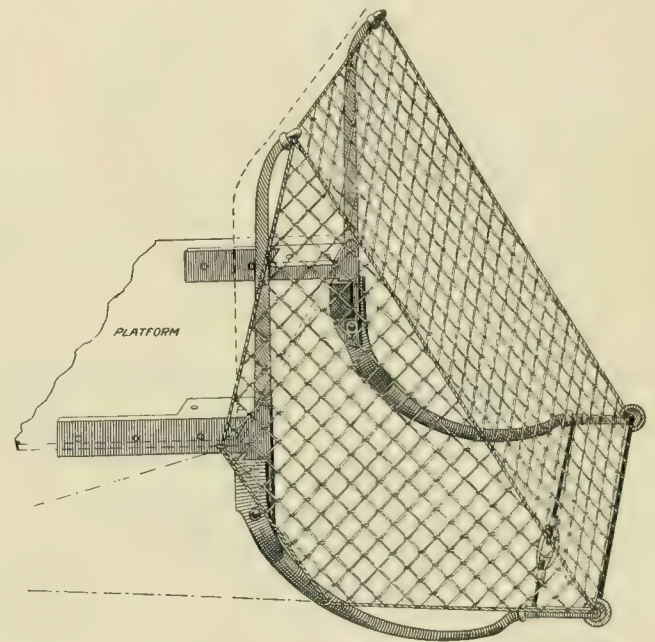
Plymouth Corporation Tramways has adopted an express system, delivering parcels along the line of the road and abutting streets. The charge is a single fare for each parcel weighing not to exceed 21 pounds, and occupying no more space in a car than is allotted to one person. Tradesmen are largely patronizing this department. The company has completed a new terminal station, in which is a receiving office for parcels, that is in charge of a young lady. On each side of the parcel room is a waiting room, one for the exclusive use of ladies and the other for the general public, each having a lavatory to which admittance can be gained on putting a penny in a slot. Upstairs are the offices of the general manager, and a dining room and reading room for conductors and drivers.

The St. Charles Street Railroad Company, New Orleans, of which B. J. Arnold, Chicago, was consulting engineer, has let the following contracts: Three 250-horse-power Hamilton cross compound direct connected engines, manufactured by the Hoover, Owens & Rentschler Company, Hamilton, O.; three 250-horse-power Heine boilers; two 500-horse-power Worthington condensers; 500-horse-power fuel economizers, of the Fuel Economizer Company, Matteawan, N. Y.

NAEGELE CAR FENDER.

Here is a car fender that was tested in Memphis, Tenn., and was entered at the recent contest at St. Louis. It consists of four main beams with other minor attachments, the entire front and sides being covered with network, which can be extended along the sides of the car to guard the wheels. The beams are fastened together with bolts just in front of and below the platform and are held by braces firmly bolted to the body of the car.

The upright beams extend as high as the dash, inclining forward and supporting the top line of network in such a manner as to prevent a tall person in falling from striking his head against the dash. The lower beams in front of the car fall to a distance of two inches or less



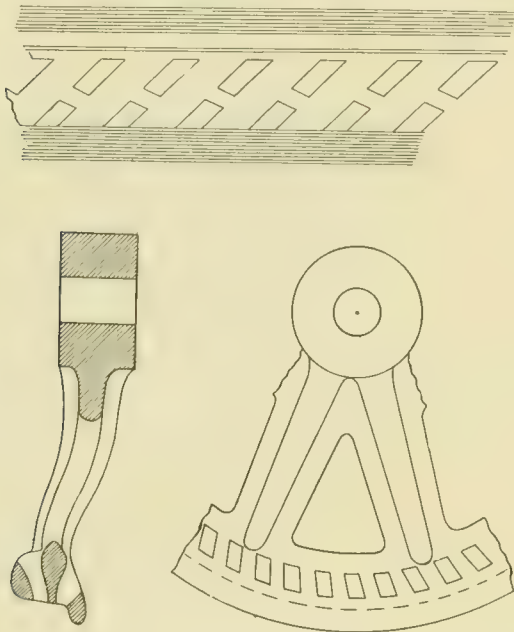
NAEGELE CAR FENDER.

above the track, extending about three feet from the car, although the distance can be shortened to thirty inches or less, on account of the upper beams and line of network extending above the dashboard. The forward ends of the lower beams are made to slightly incline upward, being provided with soft rubber bumpers to break the shock and prevent further injury to the person struck. The undulating motion of the car does not interfere with the fender, which is arranged so that even a dip of two feet may occur without injuring it. The lower line of the fender is a $\frac{5}{8}$ -inch rope covered with soft rubber hose, while across the car bumper is swung a large cushion of water proof cloth filled with excelsior. The fender can be folded back against the dashboard, taking up little room. It is the property of E. F. Naegle, Memphis, who says the tests have been satisfactory.

J. S. Hill has resigned his position as superintendent of line construction on the West Chicago Street Railroad, to take charge of the construction of the Los Angeles Traction Company.

NON-SLIPPING AND ICE CUTTING CAR WHEEL.

Street railway managers will not have to trouble themselves about ice on the track for several months to come, but for future reference, it is interesting to note the trial, during the closing days of the past winter, of a new form of street car wheel, which was successful in smashing through ice. The novel feature of this wheel is that it has a slotted tread. The slots extend clear through the tread. The wheels are of the best manganese steel. They are the invention of Leonard Roll of the Vulcan Iron Works, Wilkesbarre, Pa. The trial referred to, was made on the Wilkesbarre & Wyoming Traction Company's lines. The lines to Pittston and Nanticoke, nine miles from Wilkesbarre, had been closed for several



days, following a big snow-storm, and the snow was packed tight and frozen to the rails. The wheels proved a great aid, not only in smashing through the ice, but in preventing slipping. The slots in the tread being smallest at the bottom, they can not clog with snow or ice. For use in contending with snow and ice it seems to be a very valuable invention.

A CHANCE FOR US TO GET RICH.

An inventor of street railway appliances who has evidently taken up the business with the idea that it is a good direction in which to give vent to his overwhelming inventive faculties makes us a very tempting offer as follows:

"gents Dear sir in reply to yours of feb 20th would say we enclosed as you requested us. and we will give you ten percent for any and all sales caused by you if we except them.

yours very resp—y"

It is unnecessary to say that he is not a regular reader of the REVIEW.

WHAT A PATENT IS.

A patent is a writing granted by a sovereign power, which secures to an inventor for a term of years the exclusive right to his invention. A United States patent grants to the inventor a monopoly of his invention for a term of seventeen years, and if this term does not grant him a sufficient opportunity for remuneration the term may be extended by special act.—Electrical Review.

Is it?

A patent is a weariness to the flesh and a vexation to the spirit. As a scheme to sink money nine out of ten patents are a cyclone of success.

"A patent is a writing granted by a sovereign power which secures to an inventor for a term of years" litigation which evolves itself like unto a long distance telescope. A patent is his so long as he has more money than the other fellows who take a notion to infringe, and while he is maintaining those sacred rights conferred by the aforesaid sovereign power, he goes bust and his family come to want.

A patent is a scheme of the evil one to tempt men on from failure to complete failure. It is so much of a lottery it's a wonder exclusion from the mails has not been ordered.

Verily, where is he who at some time hath not toyed with a festive patent scheme; and mark what wisdom cometh and experience from the promoting of a patent. It is like unto what a jack pot is said to be. The player antieth with caution at the first and then must he raise himself so long as the barrister wills, and he antieth and antieth until he is all antied out, and if perchance he wins the pot, verily the chances are the bank refuses to cash in his chips.

"* * * for a term of seventeen years, and if this term does not grant him a sufficient opportunity" to waste his time and money, he may, by special act, have the torture prolonged.

Theoretically, patents are pots of gold at the off side of rainbows; practically they are a delusion and a snare on the nigh side of life.

Never apply for a patent to-day or to-morrow. The only absolutely safe time is yesterday.

The Goubert Manufacturing Company has changed its Pittsburg address to 1012 Carnegie building.

The Mason Electric Company, No. 9 Adams street, of which W. R. Mason was general manager, has failed, with liabilities of \$5,000 and scheduled assets of \$1,100. of this sum, however, the salable material will hardly exceed \$600. Principal creditor is Iroquois Club, rent, \$540, and the Medbury Company, \$400. There are also several judgment notes. Mr. Mason has again opened up at 24 Plymouth place, as the Mason Electrical Equipment Company, and will handle the Medbury line of materials and act as agent for several other concerns. The Railway Equipment Company, of which Mr. Mason was manager, failed January 3, 1894.

ANOTHER "HOME MADE" SNOW PLOW.

BY I. B. WALKER, SUPERINTENDENT SIOUX CITY TRACTION COMPANY.

Having noticed cuts and descriptions of snow sweepers and plows in your paper from time to time of "Home Made" and other makes, and having an electric sweeper of the "Home Made" type, I send you a photograph and a short description of one which we turned out in our own shops last October. Although having had no very severe snow storms the present winter, we have had the sweeper out several times, and did such successful work that even our single motors made schedule time.

motors can be examined by simply raising a hinged trap door which is covered with canvass, treated the same as the top of the car. The motor is first geared to a loose running double sprocket placed upon a stationary hanging shaft which is securely attached to the diagonal portion of the frame and to which the broom is secured by means of projecting arms. The broom has a split sprocket gear in the center, over which the chain from the double sprocket passes. Thus, as the broom is raised and lowered all centers are preserved. The lifting device can be seen quite plainly in the cut. On each axle is a motor and the two are controlled as in ordinary street cars, but the rheostats are placed inside of the cab and thus become very good electric heaters. There are



I. B. WALKER'S SNOW PLOW.

The truck is an ordinary street car truck of 7 foot wheel base. On this truck is built a very heavy frame, made of 6x8 Georgia pine, with oak cross ties bolted together with $\frac{5}{8}$ inch Norway iron bolts, running through the full width of the frame, having heavy cast iron washers under the head and nut. All the corners are braced with heavy boiler steel, and the frame also braced with heavy truss rods as shown in the photograph. The cab is a very neat 12 foot horse car body, overhauled and nicely painted for this special case. The brooms are made of the best rattan, and each driven by a No. 6 Sprague motor, mounted on the platforms and covered with a wooden case, made to fit neatly over the entire motor and gearing, and which can be lifted off by handles provided for the purpose, in case any repairs are needed on the motors. The bearings and brushes of the broom

two sections of the rheostat which control the two car motors, and two for the broom motors. The two broom motors, however, each run independently of each other and of the car motors. Or by the simple movement of a switch lever the brooms can be operated in conjunction with the car motors. On the other hand, in case you are approaching a deep drift, you can advance the car as slow as you wish, and at the same time raise the brooms through five degrees of speed. The braking is done by the use of the electric brake principle, which I have had in use on our steep grades here, three years since last November. Each end of the car has its own headlight placed on the hood, and each end also has a signal light. A three light cluster is placed in the center of the cab. The wiring is so arranged that the cluster is constantly in circuit with either end, that is, when light

is wanted. The end lights are thrown in or out by the movement of a lever, thus, when you reach the end of a line, throw the lever over and the rear end lights are out and the front end lights are in. The signal lamps are attached to long cords, and can be carried to any part of the sweeper. There are also steel track brooms and ice diggers, all operated from levers placed in the cab. The sweeper is operated successfully by one man, with a boy to watch the trolley. In fact I sit on a stool by the electric heaters (rheostats) and operate the whole business, by having a boy to watch the trolley, and lower and raise the brooms at the end of the route. As the rear broom is always up, the front one is doing all the work. I should have mentioned before that each end of the car is provided with a large sand box under control, by a lever from the operator's position. Reserve sand is carried under the seats which are placed in the central portion of the car on either side, and accommodate three passengers each.

Other points might be mentioned, but enough has been said to give the reader a very good idea of what a street railway company can do at home for about \$600, that will cost \$3,000 or \$4,000 abroad. We have had some very flattering comments from street railway men who have been around, and we feel fully satisfied with our expenditure and the results of our experiment. Personally I can say that I feel fully repaid for the "midnight oil."

NOT COMPELLED TO HEAT CARS.

In the suit of Mrs. Marie Roy against the Springfield, Mass., Street Railway Company for \$20,000 damages for injury to her health by reason of exposure in an unheated car, the jury has recently returned a verdict for defendant. During one of the heavy snowstorms of February, 1893, Mrs. Roy, one evening, took passage in a car of the company at Indian Orchard. The car proceeded but a short distance, when it became stalled in a drift. This car was heated. Soon another car attached to a snowplow came up. Mrs. Roy left the warm car and entered the cold car behind the plow, thinking to get home quicker. The conductor told her there was no fire in his car, and that she would do better to stay in the other, but his advice was unheeded. Her mother's residence and an hotel were close at hand, and being accompanied by her husband, she could have left the stalled car and gone to either place, in preference to the cold car. Unfortunately, this car also came to a stop, and she was obliged to spend the night in it, not reaching Springfield until 5:30 the next morning. She claims that she contracted a hard cold, and, after a severe illness, has been troubled with a spinal complaint and nervous derangement.

The judge ruled that there is no law to compel the company to heat its cars, and that if the company used every effort to get the car home in reasonable time, she could not recover. The jury evidently took the view that every reasonable effort had been made by the company, for a verdict in its favor was given after it had

been out a very short time. Plaintiff's counsel has filed a bill of exceptions, and the case will be appealed to the supreme court.

GOT 'EM AGAIN.

One John Sturgeon, of Leeds, England, who gives evidence of being considerable of a fish, has returned to his native heath loaded to the guard with hair-lifting stories of electrolysis. Our readers will doubtless recall the word electrolysis as the subject of some comment several years ago in the early days of trolleys, but which has now almost passed from memory.

The London Electrical Review comments very sensibly on the matter as follows:

"Mr. John Sturgeon, of Leeds, records some remarkable occurrences in connection with electric traction in America, which, if true, would lead the citizen of Dublin to suppose that he can only enjoy the advantages of electric transit at the cost of converting his home into a sort of a powder magazine. In one case, recorded by Mr. Sturgeon, crossing gas and water pipes brought into contact by the vibration of the street, struck an arc, burnt a hole in the gas pipe, and set a house on fire. This tale appears on the face of it to be improbable, and, for an American yarn, incomplete, since we would expect that the arc would next have burnt a hole in the water-pipe and extinguished the fire. 'In another case, a plumber had occasion to cut a water-pipe in two, when an electric arc formed at once between the severed ends.' The severed ends of the water-pipe were both to earth, and yet we have to believe that there could have been a potential difference of 20 or 30 volts between them! These and other tales, possessing all the characteristic exaggeration of American humor, appear to have been seriously accepted by Mr. Sturgeon as facts. Nor are we surprised at Mr. Sturgeon's inability to discriminate between the true and the false in these questions when we come to read his views on the laws of electric currents a little further on. The resistance of electric conductors, according to Mr. Sturgeon, is proportional to the square of the velocity (of electricity), 'and will be four times as much for two cars as for one.' 'The electric current naturally follows the line of least resistance, and when the rail become surcharged as it were, it seeks other outlets along pipes and other buried metal work. As these in time lose their conductivity by corrosion the current wanders off through service pipes into houses, etc.' Mr. Sturgeon's misconception of the action of currents on gas and water-pipes, appears to be equalled only by his ignorance of the simplest laws of electricity. It is difficult to imagine that anyone, in these days of cheap text-books and technical schools should be able to retain such fallacious ideas, that he should pose as an instructor of the public is incredible. That return earth currents produce at certain points increased corrosion in pipes we explained in our last issue, but we also showed that there are simple means known to electrical engineers by which this injurious action can be prevented."

ELECTRICITY ON NEW YORK CENTRAL.

Chauncey M. Depew is reported as confirming the report that the New York Central will equip its branch line between Buffalo and Niagara Falls with electricity. He says:

"We received word that a local company intended 'paralleling' our tracks from Buffalo to Niagara Falls. That set us to thinking. If there is money in it for an outside corporation, there ought to be for us. This company would have to build a new roadbed, place rails and wire, erect stations and purchase everything necessary to the building of the road. Now we have a good solid roadbed, rails, stations and so on. All that is necessary is for us to wire our line and provide cars. The present schedule, and, indeed, the schedule in effect in summer during the excursion season, is such that a great many electric trains can be run between the regular trains.

"We have not decided on what kind of cars or motor will be used. However, I can say that the cars will be large and comfortable. The trains will be run at a high rate of speed, and safety and comfort will be carefully looked after. The new trolley line will have many things to recommend it to the public. The dust and cinders that accompany a steam engine will be done away with. The cars will be open and a good view can be obtained from them. We shall probably get our power from the Niagara Falls Power Company."

MONTREAL WILL USE A ROTARY SNOW PLOW.

The Park and Island Railway expects to construct a number of new lines this summer, including routes to Lachine, St. Laurent, St. Vincent de Paul and Cartierville.

During the past winter the snow has been very deep on the tracks of this company, in many places nine feet deep, but by extra exertion only a few day's traffic has been missed altogether. In future, snow plows will be made of a number of rotating shovels or ~~plows~~ ^{scrapers}, followed by a rotating broom, since it has been found that such a combination gives greater efficiency when working in frequent heavy drifts.

DEPEW'S LATEST.

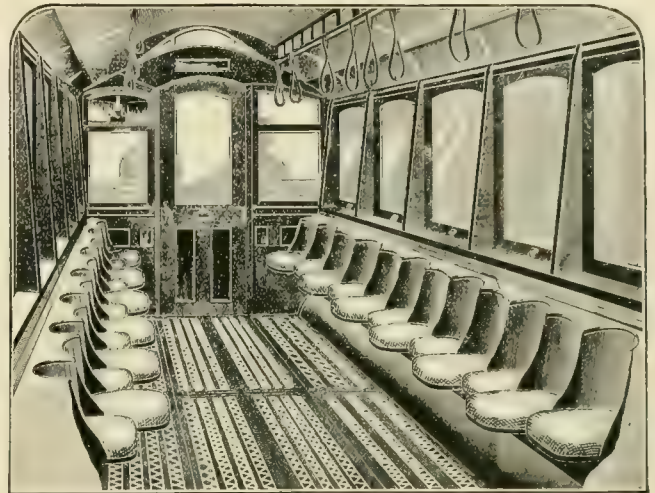
The doctor's latest story, and one which, by the way, he did not relate when in Chicago last week, we copy from the National Car and Locomotive Builder. Here it is:

"There was once a prominent man in Chicago who, like all others out there, had a very exalted opinion of his town. He died, and when he reached his eternal home he looked about him with much surprise, and said to the attendant who had opened the gate for him: 'Really, this does great credit to Chicago. I expected some change in heaven.'"

The attendant eyed the Chicagoan a second, and then observed: "This isn't heaven."

INCREASES SEATING CAPACITY.

"No seat no fare" howlers make more noise than those who are continually demanding fenders for trolley cars, and managers have adopted many expedients to make the lot of their passengers more comfortable. G. B. Bolton has patented a plan of seating cars that seems to be of some advantage, as Mr. Bolton says he can add two seats without crowding to the ordinary capacity of an 18 foot car. The greatest amount of room is at the



BOLTON'S SYSTEM OF CAR SEATING.

shoulders, where it is most required, and the division arms are so placed that they take up none of the seat room. The cushions are made with springs, and can readily be taken out for cleaning, while the seat frame is made in skeleton form, so that all dust and dirt can easily fall to the floor. Mr. Bolton says the seats are more economical than continuous seats, as the upholstery is held much more firmly, while the passenger, once taking a seat, holds it and is not continually moving along to make room for others, thus wearing the covering. The seat is made in sections, so in case of any damage to any of the parts, they can be re-covered or re-upholstered at a small expense, while a continuous seat often has to be re-covered when damaged in only one or two places.

NEW ELECTRIC LINE GOES INTO OPERATION IN FRANCE.

The construction of the electric railway between Nice and Cimiez, which was reported in the REVIEW, has now been completed. Storage batteries furnish the current, and the cars are of the open end and side type, with capacity for 32 passengers. Each car is equipped with 90 cells of the Laurent-Cely type, capable of furnishing sufficient energy for one hour, or three round trips. Each battery weighs 2½ tons. Toothed gearing communicates motion from the two motors to the axles. The gage is 60 centimeters, or 1 foot, 11⅝ inches.

EMPLOYEES' READING ROOM

PART IV.

The Metropolitan Street Railway Club is an organization of the semi-official and clerical force of the Metropolitan Street Railway, New York, and was established for fraternal and educational purposes. At its regular meetings, lectures are given and papers read, on technical and practical questions of operation and construction, taking in the different methods of traction, and all subjects in connection with traction, illustrating and explaining all such subjects as "Cable Curve Constructions and Their Operation," "Various Brakes and Their Mechanical Application," "Electrical Overhead and Underground Traction." These meetings are thrown open to all employes of the company, irrespective of membership, that all may have the benefit of their instructive teachings, and discussion is invited from all present.

Regular meetings of the club are held on the first Tuesday of each month, and informal meetings on second, third and fourth Tuesdays. On February 5, a musical entertainment was given, and a lecture on the "Generation of Electricity," by L. J. Hirt, assistant chief engineer, who also lectured February 19 on "Hydraulic Brakes." A theater party was organized for March 21, the 150 tickets for this entertainment being all sold within 48 hours. On April 2, M. Moore gave an exhibition of cable splicing, splicing a full size cable. More elaborate lectures, with stereopticon views, will be given in the future.

The temporary quarters of the club are in the company's office building. Two years hence permanent quarters will be taken in the car house at Fiftieth street, now under construction. Here will be completely appointed parlors, reading rooms, library, restaurant and a lecture hall.

Reading matter for the library is being collected by the executive committee. Books, daily newspapers and technical magazines will be given particular attention. One of the first of the latter to be selected by the committee was the STREET RAILWAY REVIEW.

When organized, a few months since, the club had 75 members; it now has double the number. F. D. Rounds, assistant superintendent, is president of the club; L. J. Hirt, assistant chief engineer, is vice president; W. P. Plummer is secretary and George Warden, treasurer. The executive committee consists of the foregoing and H. H. Vreeland, president, and C. E. Warren, secretary, of the company, who have taken a warm interest in the formation of the club.

C. E. Warren, chairman of the executive committee, expressed himself as follows: "The club will prove a good thing for all of its members. It will make them better acquainted with each other, and thus many mis-

understandings that might lead to trouble and useless strikes will be avoided. It is a good thing for each man to realize that all of the others are taking a personal interest in him—that is, outside of the simple association in their employment. It is a splendid thing for many of the men who have no homes, to feel that there is a bright, cheerful and comfortable place where they can go and find plenty of good reading matter and congenial companions, and where they can find aids to a better knowledge of their business. Such a place is much better than to have to frequent saloons for sociability. Everything possible will be done for the proper amusement and helpful instruction of the members to make their daily lives more pleasant and to better fit them for their duties as employes of the railway companies. The very best entertainments and instructive lectures will be furnished, and we expect the desired results to follow."

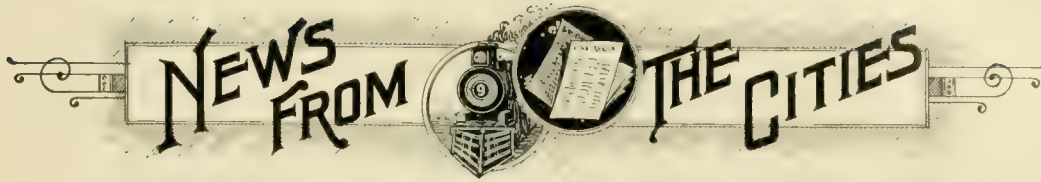
Several large roads have similar organizations, which have proven profitable to the members, and such memberships will be seen to be valuable when positions on other roads are sought.

THOSE BIG SLEEVES.



MAY BE PRETTY—BUT ARE MIGHTY INCONVENIENT IN STREET CARS.

The Phoenix Iron Works Company, of Meadville, Pa. with offices at 519 Rookery, reports business greatly improved. Among recent orders are a 100-horse-power engine for the Chicago Cloak Company, Chicago; two 300-horse-power engines for the Detroit & Mount Clemens Electric Railway; three 100-horse-power boilers for the Tacoma Traction Company, and three 100-horse-power boilers for Portland, Ore. This company manufactures the well-known Manning boilers, and has just taken an order for a 500-horse-power plant for a New Jersey street railway.



Alabama.

GUNTERVILLE, ALA.—Mr. Swazey, of Boston, is promoting a bicycle railway from Scottsboro to Columbus City.

California.

NILES, CAL.—W. H. Ford is director of a proposed interurban electric road.

SANTA BARBARA, CAL.—Reed & Ashton have applied for an electric road franchise.

HAYWARDS, CAL.—Application has been made to the county supervisors for an electric road franchise to Mt. Eden.

POMONA, CAL.—R. F. House and James Loney have bought the Pomona Street Railroad Company, a motor line.

OAKLAND, CAL.—Daniel Chisholm and H. S. Petermann have applied for a franchise for an electric line between Haywards and Mt. Eden Landing.

STOCKTON, CAL.—Henry Bunn, Peoria, Ill., has offered to supply money to build an electric road to Lodi, contingent on a donation of ten acres in each quarter section flanking the road.

OAKLAND, CAL.—The Consolidated Piedmont Cable Company has reorganized with Charles Bishop, president; E. A. Heron, vice-president; Daniel Grant, secretary; Oakland Bank of Savings, treasurer. The company will be incorporated with \$1,000,000 capital.

LOS ANGELES, CAL.—The Los Angeles Railway Company has been incorporated and absorbed the stock and bonds of the Los Angeles Consolidated Electric Railway Company. Thomas Brown, of the Bank of California, is president. There will be a new general manager, probably Morris Trumbull, representing Chicago bondholders.

Canada

TORONTO, ONT.—The Toronto Railway Company has secured control of the Toronto & Scarboro system.

NEW WESTMINSTER, B. C.—The Westminster & Vancouver Tramway Company will be sold April 13, under foreclosure.

MONTREAL, QUE.—The Montreal Park & Island Railway Company has been granted an exclusive franchise in St. Laurent. Construction work will be begun soon.

HALIFAX, N. S.—John Y. Payzant, Adam Burns, W. B. Ross, Halifax; James Ross, Montreal; Henry M. Whitney, Boston, have organized a company to build an electric road.

CARLTON PLACE, ONT.—It is reported that a company has been organized to construct twelve miles of electric road, from Napierville to Remi, Que., and another road from Lanark to Perth.

LONDON, ONT.—The proposition of the London Street Railway Company to equip its lines with electricity has been accepted by the city council, and contracts for material, etc., will be let at once.

NIAGARA FALLS, ONT.—E. A. C. Pew is interested in the proposed electric railway to St. Catharines and Toronto. The power, will be furnished by a water power plant to be built by the Hamilton & Lake Erie Power Company.

Chicago.

CHICAGO.—The Cicero & Proviso Street Railroad Company has been granted a franchise for an extension.

CHICAGO.—An ordinance granting a 20-year franchise to the Chicago Passenger and Traction Company has been introduced in the council.

CHICAGO.—The Osburn Electric Supply Company has been incorporated with \$12,000 capital by Harry G., M. Roy Osburn and Asa W. Waters.

CHICAGO.—The Chicago Truck & Steel Casting Company has been incorporated with \$150,000 capital, by George H. Graham, G. G. Taylor, M. J. Brady.

CHICAGO.—The Baird Electric Conduit Company has been incorporated with \$5,000,000 capital by F. E. Baird, 7130 Wentworth avenue, G. E. Baird, W. H. Craig, Merchants' building.

CHICAGO.—The Chicago Subway Arcade & Traction Company has been incorporated with \$15,000,000 capital by C. F. Griffin, 1114 Tacoma building, M. E. Barnhart, 1114 Tacoma building, J. K. Nelson.

CHICAGO.—License to incorporate the Interoceanic Electric Railway Company with \$200,000,000 capital has been granted James G. Hulse, Parker Crittenden, John W. Hill. It is proposed to build an electric line from New York to San Francisco, besides many other things almost as practicable.

Colorado.

DENVER, COL.—It is reported that the Pike's Peak Cog Wheel Railway Company will build an electric railway connection to compete with the hack lines.

Connecticut.

MONTVILLE, CONN.—The Montville Horse Railroad Company has petitioned the legislature to have its name changed and to use electricity.

MIDDLETOWN, CONN.—It is said the work will soon be begun on the Middletown & Cornwell electric road. Israel A. Kelsey, West Haven, is president.

WEST HAVEN, CONN.—Israel A. Kelsey is president of a company that will soon begin work on an electric road between Middletown, Cromwell and Durham.

NEW HAVEN, CONN.—The Kelsey Electric Railway Specialty Company has been incorporated with \$20,000 dollars capital by Frank N. Kelsey, Charles L. Wright, William W. Miner.

NEW BRITAIN, CONN.—Permission has been granted the Central Railway & Electric Company to extend its system, in consideration of a tax of 1 per cent on the gross earnings, if exceeding \$200,000 per annum.

WESTPORT, CONN.—It is reported from Norwalk that the New York, New Haven & Hartford Railroad Company is to buy a controlling interest in the Westport & Saugatuck Horse Railroad Company and electrically equip it.

Delaware.

WILMINGTON, DEL.—The Newcastle & Wilmington Electric Railway Company has been granted a franchise and will build a bridge.

WILMINGTON, DEL.—Isaac N. Grubb and others have applied for a charter for the Wilmington & West Chester Electric Railway Company, with \$500,000 capital.

DOVER, DEL.—The Dover & Milford Electric Railway Company has been organized with W. T. Watson, Milford, president; John D. Hawkins, Dover, secretary.

WILMINGTON, DEL.—The Elsmere & Wilmington Electric Railway Company has applied for a charter, with \$100,000 capital. The incorporators are E. H. Gayley, W. J. Ellison, W. B. Johnson, F. D. Lackey, D. W. Taylor.

District of Columbia.

WASHINGTON, D. C.—The Washington & Marlboro Electric Railroad Company has opened stock books, and will begin construction as soon as possible.

Florida.

ORLANDO, FLA.—E. W. Henck has secured a franchise for 25 miles of electric road.

TAMPA, FLA.—The Consumers' Electric Light & Street Railway Company will make improvements, including additional turbine wheels and an auxiliary steam plant. The lighting plant will be enlarged.

KEY WEST, FLA.—It is reported that the Key West Street Railway Company has been sold to J. J. Philbrick, president of the Key West Gas & Electric Light Company, who will change the equipment to electric.

Georgia.

MACON, GA.—The Macon Consolidated Railway Company will extend its line.

STRATHAM, GA.—Editor Hayes, of the News, is projecting an electric railway to Tallasse.

ATLANTA, GA.—The Atlanta Electric Railway Company has received its franchise. The Hale Investment Company will let contracts.

Illinois.

PANA, ILL.—George Dowell is interested in a proposed electric line

PEORIA, ILL.—Leander King is surveying the route for the Peoria & Pekin electric road.

PEORIA, ILL.—A decree of sale of the Fort Clark Electric Railway Company has been entered.

VENICE, ILL.—Construction of the Venice, Madison & Granite City Electric Railway will begin in June.

DANVILLE, ILL.—Capt. Edwin Winter is attorney for capitalists who are after an electric road franchise to Hoopston.

BELLEVILLE, ILL.—The St. Louis, Belleville & Southern Railroad has succeeded the Belleville City Railway Company.

BLOOMINGTON, ILL.—The Bloomington Electric Light & Power Company's power house was burned, causing a loss of \$75,000.

ALTON, ILL.—William Eliot Smith, owner of the Illinois Glass Works, is reported to be interested in a project to build an electric line to North Alton.

GREENVILLE, ILL.—The Greenville Light, Heat & Power Company has been incorporated with \$25,000 capital, by Ernest G., Samuel E. and Alice H. Bruckman.

ELGIN, ILL.—The Carpentersville, Elgin & Aurora Street Railway Company has secured right of way from Carpentersville. Construction is expected to begin soon.

MURPHYSBORO, ILL.—The Murphysboro Street Railway Company has been incorporated with \$11,000 capital, by Thomas W. Logan, A. B. Minton and S. W. Ward.

VENICE, ILL.—The Venice, Madison & Granite City Railway Company has been incorporated with \$60,000 capital, by C. H. Sharman, Fred E. Allen, E. J. Spencer.

LAKE FOREST, ILL.—The Interurban Electric Railroad Company has been granted a franchise to Fort Sheridan, on condition that \$5,000 be put on construction this season.

BLOOMINGTON, ILL.—The Bloomington Traction Railway and Electric Company, Bloomington, has been incorporated with \$75,000 capital, by George W. Funk, Henry Cape, James A. Wilcox.

PEORIA, ILL.—Richwood's Street Railway Company has been incorporated with \$50,000 capital by Robert M. Cox, James M. Morse, Theodore J. Miller, to build street railways in Peoria, Tazewell and Woodford counties

CHARLESTON, ILL.—The Charleston Electric Company has been incorporated with \$5,000 capital by Richard Cadle, Frank A. Brooks, W. A. Highland, "to manufacture electricity and operate telephones and street railways."

ELGIN, ILL.—The Carpentersville, Elgin & Aurora Railway Company has been incorporated with \$50,000 capital by Alfred B. Church, David B. Sherwood, William Grote, James R. Lane, F. Dunbar Waldron, George M. Peck, all of Elgin.

Indiana.

FRANKTON, IND.—Charles L. Henry has been granted a ninety-nine year street railway franchise.

MADISON, IND.—It is reported that the Madison Street Railway Company will equip with electricity.

MICHIGAN CITY, IND.—H. B. Tuthill and Dr. A. G. Tillotson are interested in the proposed line to Laporte.

DUNKIRK, IND.—C. P. Cole is interested in a project to build 40 miles of electric road from Portland to Alexandria.

MARION, IND.—The Marion City Railway Company will double track its road, build a power house and install additional machinery.

MARION, IND.—David Overman is interested in the Independence Electric Railway Company, which has applied for a franchise.

LAPORTE, IND.—H. B. Tuthill and A. G. Tillotson, Michigan City, have been granted an electric road franchise to Michigan City.

SOUTH BEND, IND.—The Inter-State Power Company has been incorporated with \$100,000 capital to build an electric line to St. Joseph, Mich.

MARION, IND.—The Marion Queen City Electric Railway Company has been sold at receiver's sale to the Marion City Railway Company, for \$30,000.

SOUTH BEND, IND.—The Central trust Company, New York, has foreclosed mortgages for \$290,000 on the South Bend & Mishawaka Street Railway Company.

HAMMOND, IND.—A. M. Turner, manager of the Hammond Electric Railway, is in the market for one 14 or 16-foot body second-hand motor car complete, and two open trailers.

HOBART, IND.—A. Morrison is president, and A. J. Smith, secretary of the Hobart Electric Railway Company, which proposes to build an electric line to Chicago. The capital stock will be \$250,000.

Iowa.

KEOKUK, IA.—J. C. Hubinger, has applied for an electric railway franchise in Ft. Madison.

MARSHALSTOWN, IA.—The Marshalstown Light, Power & Electric Railway Company will extend its line.

SIoux CITY, IA.—It is reported that the Riverside Elevated and the Jackson Street railways will be consolidated.

MURRAY, IA.—I. V. Cochran, T. W. Huguen and George Christy are soliciting stock subscriptions for an electric road to Hopeville and Lorimer.

Kansas.

KANSAS CITY, KAN.—Attorney C. F. Hutchings says the Farmers' Loan & Trust Company, New York, will apply for a receiver for the West Side Street Railway Company.

Kentucky.

COVINGTON, KY.—The Suspension Bridge Company will extend its bridge to Second street.

LOUISVILLE, KY.—The Walnut street stables of the Louisville Railway Company were burned, sixty two mules escaping. Loss, \$20,000.

PADUCAH, KY.—J. W. Keiler, Frank Fisher, W. F. Paxton have purchased the old Citizens' Street Railway Company for \$20,000, and will extend the line.

Long Island.

PORT JEFFERSON, SUFFOLK COUNTY, L. I.—O. T. Fanning and others will build 15 miles of electric road to Patchogue. It will be used largely for freight.

Maine.

PORTLAND, ME.—The Portland & Rochester Railroad Company is contemplating using a storage battery system. The Mousam River Railroad Company is also interested.

Maryland.

BALTIMORE, MD.—The Baltimore & Powhatan Railway Company will extend its line $2\frac{1}{2}$ miles.

BALTIMORE, MD.—Simon J. Martenet has a franchise for an electric road from Baltimore & Jerusalem Turnpike Company.

BALTIMORE, MD.—The county commissioners have granted a franchise for an extension to the Baltimore Traction Company.

BALTIMORE, MD.—The additional franchises asked for by the Baltimore, Middle River & Sparrows Point Railroad Company have been granted by the county commissioners.

BALTIMORE, MD.—The Baltimore, Westport & Annapolis Electric Railway & Tramway Company will be incorporated with \$100,000 capital by Henry Y. Bready, A. C. F. Boehme, Jr., O. P. Baker and others, all of Baltimore.

BALTIMORE, MD.—The Baltimore, Severn Park & Annapolis Railway Company has been incorporated with \$100,000 capital by G. Howard White, Benjamin F. Simons, David S. Collett, Dr. Robert B. Johnstone Robert J. Dungan, Arthur M. Easter.

Massachusetts.

DETROIT, MICH.—The Detroit Railway has asked for additional franchises.

WELLESLEY, MASS.—The Wellesley & Boston Street Railway Company will construct a line.

NORTHAMPTON, MASS.—The Northampton Street Railway Company is contemplating an extension.

SPRINGFIELD, MASS.—The Springfield Street Railway Company has been permitted to issue \$300,000 additional stock.

NEWBURYPORT, MASS.—It is reported that the Essex County Street Railway Company will construct its line this season.

WORCESTER, MASS.—A power plant will be erected by the North End Street Railway Company. Extensions are contemplated.

NORTH ATTLEBORO, MASS.—The old Attleboro, North Attleboro & Wrentham line is in the hands of an engineer for thorough repair.

SPRINGFIELD, MASS.—Judge A. W. Curtis and Thomas J. Comins are interested in a proposed electric road from Spencer to West Warren.

WAKEFIELD, MASS.—It is reported that contracts are about to be let for 3 miles of electric road by the Wakefield & Stoneham Street Railway Company.

NEWTON, MASS.—H. B. Day, F. R. Cutter, C. I. Travelli, G. H. Ellis and G. R. Blaney are organizing a company with \$45,000 capital, to build an electric road.

STOUGHTON, MASS.—The Stoughton, Canton & Sharon Electric Railway Company has been organized with these officers: Elisha C. Monk, president; H. W. Britton, treasurer; A. M. Bridgeman, clerk.

WORCESTER, MASS.—The Worcester & Suburban Street Railway Company will issue \$200,000 in bonds for construction work, etc. There is a move to consolidate with the Consolidated Street Railway Company.

ATTLEBOROUGH, MASS.—The Inter-State Railway Company was sold for \$110,000 to Edward R. Price, representing the syndicate that bought the Attleborough, North Attleborough & Wrentham Street Railway Company.

STOUGHTON, MASS.—The Stoughton & Canton Street Railway Company has been incorporated by Henry W. Britton, E. C. Monk, Charles Tenney, H. L. Johnson, Alfred Upham, George E. Belcher, Charles W. Welch, George W. Mantle.

EAST WEYMOUTH, MASS.—John M. Simmons is president, C. S. Cushing, vice-president, Charles H. Killam, secretary and treasurer, of the Plymouth County Railroad Company, with \$250,000 capital, to build twenty-five miles of electric road to Brant Rock.

TURNERS FALLS, MASS.—The Montague Street Railway Company has been incorporated with \$40,000 capital, to build five miles of electric road, by H. L. Pierce, C. E. Dresser, Leominster; F. E. Low, Greenfield; F. E. Allen, J. F. Bartlett, Turners Falls; I. Chenery, G. H. Andrews, Montague.

WARREN, MASS.—The Warren, Brookfield & Spencer Railway Company will be incorporated with \$2,000,000 capital to build fifteen miles of electric road, and \$100,000 has been subscribed. The following are interested: J. L. Currier, H. P. Gerald, Worcester; John J. Mulcahey, G. H. Coolidge, West Brookfield; Alvin Hyde, E. E. Chapman, W. G. Keith, East Brookfield.

Mexico.

MEXICO CITY, MEX.—The Gugenheims, Boston, are said to be interested in the syndicate which purchased the street railways in this city, capitalized for \$8,000,000. The road will be converted to an electric line. William F. Joy, Boston, is purchasing agent.

Michigan.

SAGINAW, MICH.—The Consolidated Street Railroad Company will equip the Hamilton street line with electricity.

DETROIT, MICH.—The Ft. Wayne & Belle Isle Street Railway Company will put on sixteen additional motor cars.

BELLVILLE, MICH.—A. E. Coy and others are interested in a water power scheme for transmitting electricity to Detroit.

GRAND RAPIDS, MICH.—Robert S. Belknap has secured judgment for \$20,000 against the Reed's Electric Railway Company.

SAGINAW, MICH.—The Interurban Street Railway Company has been incorporated with \$200,000 capital. A steel bridge will be built.

MT. CLEMENS, MICH.—Contracts were let March 9 for the construction of the electric railway between Detroit and Mt. Clemens. The cost will be \$310,000.

DETROIT, MICH.—The Rapid Railway Company has given a chattel mortgage for \$300,000 to the Finance Company, Philadelphia. This line is being built to Mt. Clemens.

LUDINGTON, MICH.—The Epworth League Railway Company has been incorporated with \$15,000 capital, by George N. Stray, Frank Fien and John Joyce, to build an electric line to Hamilton Lake.

Missouri.

ST. LOUIS, MO.—The Jefferson Avenue Railway Company has been given permission to equip its lines with electricity.

ST. LOUIS, MO.—The Kings Highway Railroad Company has been incorporated with \$2,000 capital, by Festus J. Wade, John C. Kerry, George W. Wilson.

ST. LOUIS, MO.—The St. Louis, Kirkwood & Northwestern Railroad Company has been incorporated with \$5,000 capital, by August H. Eilers, James F. Brady and Jeremiah Ryan.

CARTHAGE, Mo.—The Joplin & Galena Electric Railway Company has been incorporated with \$120,000 capital, by E. Z. Wallover, R. A. Johnson, N. Hamilton, A. G. Kniseley, W. M. Donaldson, H. S. Herman, Harrisburg, Pa.

KANSAS CITY, Mo.—On May 20 the stockholders of the Metropolitan Street Railway Company will vote on the propositions to increase the bonded indebtedness to \$8,000,000 and to purchase the Kansas City Cable Railway Company, Kansas City & Independence Railway Company, Grand Avenue Railway Company, Kansas City & Independence Rapid Transit Company, West Side Railway Company.

Nebraska.

OMAHA, NEB.—F. B. Hibbard, Irvington, and Col. J. H. Pratt are agitating the building of 36 miles of electric road to Fremont.

LINCOLN, NEB.—The Security & Trust Company, New York, has begun foreclosure proceedings against the Lincoln Street Railway Company.

OMAHA, NEB.—The village of Dundee will vote on a proposition of issuing \$10,000 bonds, to insure the extension of the Metropolitan Street Railway Company's lines.

New Hampshire.

MANCHESTER, N. H.—The Manchester Street Railway Company will build ten miles of electric line.

NASHUA, N. H.—The Nashua Street Railway Company will extend and equip its line with electricity.

New Jersey.

PLAINFIELD, N. J.—The Plainfield Street Railway Company will extend its lines.

CAMDEN, N. J.—The Ironville Construction Company has been incorporated with \$50,000 capital.

MT. HOLLY, N. J.—It is reported that the Pennsylvania Railroad Company has made a proposition to lease the Mt. Holly Street Railway Company.

REDBANK, N. J.—S. S. Whitmore, P. B. Purdy, J. F. Dobson, D. S. Arnott, A. B. Eldridge, Brooklyn; M. H. Hazzard, A. G. Greenberg, S. B. Dutcher, James Meyer, Benjamin Frick, New York; Robert Lightfoot, Jersey City; W. B. Williams, Newark, are said to be interested in a proposed electric line to Long Branch.

New York.

OSWEGO, N. Y.—The Peoples' Electric Light Company will put in two boilers.

COHOES, N. Y.—The Cohoes City Railway Company is ready for bids for its new line. A power house will be built.

ROCHESTER, N. Y.—The Rochester Railway Company has applied for an extension.

PORT JERVIS, N. Y.—Charles D. Haines has bought the Port Jervis & Monticello Railway.

BROOKLYN, N. Y.—H. J. Morse has been appointed receiver of the Long Island Traction Company.

KINGSTON, N. Y.—Kingston capitalists have subscribed \$30,000 to build an electric line to Loch Katrine.

BUFFALO, N. Y.—The New York Central will equip its Niagara Falls branch, 26 miles, with electricity.

NIAGARA FALLS, N. Y.—The Niagara Falls & Lewiston Railroad Company is about ready to begin construction.

BROOKLYN, N. Y.—The stockholders of the Long Island Traction Company re-elected the old board of directors.

MOHAWK, N. Y.—The Mohawk, Herkimer & Ilion Street Railway Company will string wires and build a power plant.

LOCKPORT, N. Y.—Horace E. Denning, representing Charles A. Johnson, New York, has offered to complete the local road.

NEW YORK, N. Y.—The Metropolitan Traction Company will extend its cable system to the Sixth avenue and Twenty-third street lines.

HUDSON, N. Y.—It is reported that the Kinderhook & Hudson Railway Company will change to electric. The general offices are 34 Pine street, New York.

BUFFALO, N. Y.—A meeting was held in the office of Hodgson & Webster, Union Life building, to organize a company to build an electric line to West Seneca.

BUFFALO, N. Y.—Charles Schoepflin and others are interested in a proposed electric line to Ebenezer. A company is to be organized with \$40,000 capital to begin construction at once.

ATLANTIC CITY, N. J.—William Bowler represents a syndicate with \$4,000,000 capital which proposes to build an electric line to New York. The same parties are building lines near Baltimore and Washington.

OSWEGO, N. Y.—E. A. Emerick has been appointed receiver for the Oswego Electric Street Railway Company, as a result of a suit to collect \$9,000 on notes held by Charles Miller. Liabilities \$135,000; assets about equal.

NEW YORK.—Wareham & Hughes obtained judgment by default against the New York Electrical Engineering Company, 87 Pearl street, for balance for constructing and equipping an electric line from Pittsburg to Munhall Station, Pa.

GENEVA, N. Y.—The Geneva Surface Railway Company, Geneva & Waterloo Railway Company, Seneca Falls & Cayuga Lake Railway Company have consolidated as the Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company.

NEW YORK, N. Y.—The Western New York Railway Company has been incorporated with \$10,000,000 capital, by Isaac N. Seligman, Howard Mansfield, Henry A. James, Albert Strauss, Charles D. Lithgow, Edward D. Phillips, Charles C. Howard, Patrick F. Vaughan, John E. Derby.

MATTEAWAN, N. Y.—The Fishkill Electric Railway Company has been incorporated with \$50,000 capital by John T. Smith, E. K. Tompkins, Charles H. Watson, John Place, W. Weston, B. L. Smith, Fishkill-on-Hudson; S. K. Phillips, W. H. Southard, Matteawan, and Wilbur H. Weston, Newburgh, to build an electric road to Fishkill.

HAMBURG, N. Y.—The Hamburg Railway Company has been incorporated to build between Hamburg and Buffalo, a distance of nine miles. Capital, \$100,000; incorporators, William Ellwood, S. H. Koopmans, John O'Brian, L. L. Long, James E. Curtiss and R. L. Banta, Buffalo; and Hon. Thomas L. Bunting, George M. Pierce, Jacob Peffer and H. S. Spencer, Hamburg.

NEW YORK, N. Y.—The New York & Brooklyn Tunnel Company has been incorporated with \$100,000 capital by Thomas A. Patteson Jr., Charles E. Schlegel, Walter J. Aims, John C. Bucklen, Charles Kuhnemundt, John V. Bouvier, Jr., Frederick P. Delafield, Frank P. Knight, Samuel S. Slater. It is proposed to build a tunnel two miles long under the East river, large enough to accommodate two electric railway tracks of standard gage.

Ohio.

NORWALK, O.—Parks Foster has bought the Norwalk electric road.

BUCYRUS, O.—The Inland Electric Company has been incorporated with \$50,000 capital.

SPRINGFIELD, O.—The Webb-Hanford Street Railway Company has applied for a franchise.

DAYTON, O.—The city council has granted the application of the City Railway Company for extensions.

FREMONT, O.—Mrs. Eliza Moore has begun foreclosure proceedings against the Fremont Street Railway Company.

YOUNGSTOWN, O.—The Mahoning Valley Electric Railway Company has been granted a franchise through Girard and Niles.

CLEVELAND, O.—The Cleveland Electric Railway Company has voted \$1,000 for a bridge 40 feet wide across Nine Mile Creek.

BIRMINGHAM, O.—The Milan, Birmingham & Elyria Electric Railway Company is ready for bids for equipment for 28 miles of road.

AKRON, O.—The Akron & Cuyahoga Falls Rapid Transit Company will complete its line to Barberton, an injunction having been dissolved.

KINSMAN, O.—D. M. Yeomans is interested in a proposed electric line to Chagrin Falls to connect with the Cuyahoga Suburban Railway.

CINCINNATI, O.—Capitalists are negotiating with the Harrisburg Pike Company for the use of its road as right of way for an electric line.

BUCYRUS, O.—M. J. Monette, president of the Inland Electric Railway Company, says he expects to let contracts May 1 for 7 to 10 miles of line.

BUCYRUS, O.—M. J. Monnett, A. J. Scott, Benjamin Beal, E. B. Monnett and Edward Vollroth are directors of the Inland Electric Railway Company.

CLEVELAND, O.—The Cleveland & Elyria Electric Railroad Company has opened an office at 614 Garfield building, Euclid avenue and Bond street.

COLUMBUS, O.—The Columbus Central Street Railway Company has petitioned the county commissioners for permission to double track six miles of its line.

TOLEDO, O.—J. W. Caldwell is organizing a company to build an electric line to Sylvania, passing through Wauseon, Archbold, Bryan-Metamora, Lyons and several other towns.

WARREN, O.—It is reported that the Mahoning Valley Electric Railway Company, Trumbull Electric Railroad Company, and the Mineral Ridge & Niles Street Railway Company, will be consolidated.

COLUMBUS, O.—The Toledo & Southwestern Railway Company has been incorporated with \$5,000 capital, to build a steam or electric line from Clay Center to Curtice, by F. H. and N. P. Dodge, A. C. Johnson, H. B. Garrigan, D. M. Arnott.

CLEVELAND, O.—Henry A. Everett will build an electric railway to Painesville, a distance of 30 miles, at a cost of \$350,000. Much of the right of way has been secured and construction is expected to commence this summer. Frank A. Dillenbaugh is securing right of way.

BIRMINGHAM, O.—F. Burk, secretary of the Milan, Birmingham & Elyria Electric Railway Company wishes the REVIEW to announce that owing to the large amount of correspondence received, it has been necessary to file it. Replies will be sent at the proper time, according to its nature.

Pennsylvania.

ERIE, PA.—The Erie Transit Company has applied for extensions.

SCRANTON, PA.—The Seranton Traction Company will make extensions.

ALTOONA, PA.—The City Passenger Railway Company, will extend its line to Newburg.

CHESTER, PA.—The Philadelphia & Delaware Street Railway Company has been granted a franchise.

PITTSBURG, PA.—It is reported that the Second Avenue Traction Company will extend its line to Elizabeth.

HARRISBURG, PA.—The Forest City Car & Manufacturing Company has been incorporated with \$20,000 capital.

REINER CITY, PA.—The Williams Valley Street Railway Company has been granted a franchise through Porter township.

PHILADELPHIA, PA.—The Philadelphia Traction Company has increased its capital by \$5,000,000 to pay for extensions.

MEDIA, PA.—The Media, Middletown, Aston & Chester Electric Railway Company will probably do some construction this season.

FOREST CITY, PA.—The Forest City Car & Manufacturing Company has been incorporated with \$20,000 capital. Henry Box is treasurer.

WESTCHESTER, PA.—The New York, Westchester & Connecticut Traction Company has been granted a franchise for 16 miles of road.

BERWYN, PA.—The Berwyn & Devon Passenger Railway Company has been incorporated with \$18,000 capital to build an electric line. George Roney is president.

WESTCHESTER, PA.—The Edenwald Street Railway Company has applied for a franchise. Theodore Silkman, Surrogate, and John M. Digney, county clerk, are directors.

NEWTOWN, PA.—The Newtown, Langhorne & Bristol Street Railway Company has been incorporated with \$60,000 capital to build ten miles of road. Henry W. Wharton is president.

SHAMOKIN, PA.—The Shamokin & Mt. Carmel Street Railway Company is figuring on placing a telephone every two miles on its lines, so that accidents can be reported without delay.

DOYLESTON, PA.—William Jenks Fell, of Philadelphia, secretary of the Bucks County Railway Company, says work will be pushed on the line to Newtown, and that he expects a line will also be built to Willow Grove.

EAST STROUDSBURG, PA.—On April 22 the receiver will sell the personal property of the Delaware Valley Electric Railway Company, including the franchise of the East Stroudsburg & Matamores Railroad Company.

PITTSBURG, PA.—The Spring Hill Street Railway Company has elected the following: William Ahlers, president; W. J. Berkfield, secretary; J. L. Buerkle, treasurer. It is reported \$25,000 stock has been taken, and construction will begin this season.

SHARON, PA.—The Shenango Valley Electric Street Railway Company, which was recently sold by the sheriff, has been reorganized, with A. M. Jolly, Beaver Falls, president; A. R. Leyda, Beaver Falls, secretary; F. G. Barker, New Brighton, treasurer.

CARBONDALE, PA.—The Lackawanna Valley Rapid Transit Company is reported to want 10 miles 500,000 C. M. rope cable feed, 5 miles No. 0000 insulated feed wire, 2 miles strand steel guy wire, 15 open cars, 10 closed cars, 12 miles overhead material single track.

PITTSBURG, PA.—The Scoville Island Bridge Company has been incorporated with \$175,000 capital by Clarence B. Simpson, William S. Tompkins, Evan B. Long, Elisha A. Coray, Pittston; H. M. Streeter, Scranton. It is a part of the Scoville Island Electric Railway Company project.

LOCK HAVEN, PA.—The Lock Haven Traction Company, organized with \$300,000 capital, has purchased the stock and bonds of the Lock Haven Street Railway Company, and leased its lines for 999 years. C. A. Bragg, Philadelphia, is president, and Mayor Mayer, Lock Haven, vice-president.

MCKEESPORT, PA.—The McKeesport, Wilmerding & Duquesne Street Railway Company has been granted the right of way for an extension, upon which work will soon begin. When completed the company will run express cars between the Baltimore & Ohio Railroad station in McKeesport and the Pennsylvania depot in Wilmerding.

HARRISBURG, PA.—The Harrisburg & Cumberland Company has been incorporated with \$36,000 capital to build an electric road from New Cumberland to Riverton, White Hill and Shumanstown, with a branch to Newmarket. Connection will be made with the Cumberland Traction Company. President—J. J. Baughmann, New Cumberland.

GREENSBURG, PA.—Ex-Judge Saddler and Millard Thompson, of Carlisle, have formed a company to build an electric street railroad from Greensburg to Pittsburg, a distance of thirty miles. On March 8 a mortgage for \$500,000 was recorded in favor of the Union Trust Company, Philadelphia, to secure bonds with which to pay for the construction. As reported in the REVIEW some time ago the new company has bought the local electric line in Greensburg, two miles in length.

Rhode Island.

PROVIDENCE, R. I.—The Union Railroad Company will extend its line from Clyde to Natick.

South Carolina.

CHARLESTON, S. C.—It is reported that a company is being organized to build 22 miles of electric road to a resort.

Tennessee.

ROCKWOOD, TENN.—It is reported that the Roane Iron Company will build an electric line.

CHATTANOOGA, TENN.—The Chattanooga Electric Railway Company is in the market for 12 motor cars.

MEMPHIS, TENN.—John R. Godwin, E. S. Proudfit, J. W. Allison have applied for an electric railway franchise.

KNOXVILLE, TENN.—On May 24, the Knoxville Electric Railway Company will be sold pursuant to a decree of the United States circuit court.

CHATTANOOGA, TENN.—It is reported that another incline, estimated to cost \$85,000, will be built up Lookout Mountain to Lookout Inn this season.

MEMPHIS, TENN.—The Memphis Street Railway Company has been incorporated by F. G. Jones, Thomas B. Turley, Luke E. Wright, John K. Speed and W. B. Malloney, to consolidate all of the local lines.

Texas.

DALLAS, TEX.—On May 7 the Dallas Consolidated Traction Company will be sold at foreclosure.

DENISON, TEX.—Scott, Uree & Scott has received a franchise to change the equipment of the Denison Street & Belt Line Railway Company to an electric line.

DENISON, TEX.—The Denison Street & Belt Line Railway Company has changed hands. George L. McLagon is secretary. The line will be equipped with electricity.

GALVESTON, TEX.—The Buckeye Engine Company, Salem, O., has sued the Galveston City Railway Company for \$14,936.78, balance alleged to be due for machinery.

SHERMAN, TEX.—The College Park Rapid Transit Railroad Company has been sold at trustee's sale together with other property of the Denison Land & Investment Company.

AUSTIN, TEX.—The Austin Dam & Suburban Railway Company has been incorporated with \$100,000 capital, by Frank Hamilton, John H. Chiles, Carl F. Drake, Harry M. Metzger.

WAXAHACHIE, TEX.—The new owners of the Lake Park Street Railroad Company have incorporated with \$5,500 capital and these directors: William F. Lewis, R. Vickery, J. F. Strickland, S. F. Langsford, V. H. Shelton, W. E. Coleman, J. H. Couch, J. F. Phillips, M. B. Templeton.

Vermont.

BENNINGTON, VT.—The Bennington & Woodford Electric Railroad Company will build four miles of road.

STOWE, VT.—The town meeting has voted \$40,000 in 4 per cent bonds for an electric road to Waterbury.

BRATTLEBORO, VT.—The State Railroad Commissioners have granted the petition of the Brattleboro Street Railroad Company for right of way.

BENNINGTON, VT.—The Bennington & Woodford Electric Railway has elected the following: C. W. Crispel, president; H. W. Martin, vice president; C. M. Mason, secretary; W. F. Keefe, treasurer. Construction will probably begin this season.

Virginia.

PORTSMOUTH, VA.—John Finney and J. K. Sigfried, Pottsville, Pa., who recently bought the Ocean View Railway, have purchased the Portsmouth Street Railway Company, and will extend the line fifteen miles and equip with electricity.

Washington.

SPOKANE FALLS, WASH.—The Spokane Street Railway Company will build eleven vestibule cars.

TACOMA, WASH.—S. Z. Mitchell has been appointed co receiver with George W. Bird, of the Tacoma Railway & Motor Company.

LEAVENWORTH, WASH.—J. W. Arthur, vice-president of the Negro Creek Nickel & Copper Mining Company, says the company will build eleven miles of electric road to connect its mines with the Great Northern road.

West Virginia.

PARKERSBURG, W. VA.—W. R. Hurd, 320 Eighth street has the letting of contracts for the Parkersburg Traction Company.

PARKERSBURG, W. VA.—It is reported that the Park City Railroad Company has been sold to a Boston syndicate, which will equip with electricity.

PARKERSBURG, W. VA.—The Parkersburg Traction Company has been incorporated with \$1,000,000 capital.

WAUSAU, WIS.—C. S. Curtis, C. B. Bird and H. G. Flieth have applied for an electric franchise.

Wisconsin.

BARABOO, WIS.—Henry L. Deo Anges, Hoboken, N. J.; D. Harvey, Newark; E. N. Marsh, J. B. Donovan and Dr. G. S. Cramer, Baraboo; have applied for an electric road franchise from Devil's Lake to Kilbourn City.

ELECTRIC WORK BEGINS AT DUBLIN.

On March 11, the work of changing the motive power of the line of the Southern District Tramways Company, Dublin, from horse to electric, was begun by the British Thomson-Houston Company, Ltd., under the direction of J. C. Robinson, managing director and electrical engineer of the Tramways Company. The section under construction is $3\frac{1}{2}$ miles of double track, and the estimated cost, including equipment, is \$531,800. Two other sections will be changed to electric lines this season. Rails are 76-pound girder type, laid on a foundation of concrete. Double deck cars seating 24 passengers inside and 26 outside are being built, which will run an average of 8 miles an hour; each train will consist of a motor and one trailer.

The Dublin United Tramways Company has applied to parliament for a franchise to equip its entire system with electricity.

In Bristol, England, a duplicate of the Southern line is under construction.

A law recently enacted by the Indiana legislature allows electric street railways to sell power and furnish steam heat.

WAR AGAINST CONNECTICUT ELECTRIC ROADS.

New York, New Haven & Hartford Railroad Company Makes a Strong Fight In the Legislature Because It Has Lost Much Revenue.

Connecticut and Pennsylvania are the battlefields in the war that is being waged against electric railways by the steam roads. The weapons have been injunctions and decisions of courts, but they have been too weak, so that now many of the railroads are equipping branch lines with electricity. In Connecticut, one of the finest examples of pleading the baby act, on record, is on exhibition on the part of the New York, New Haven & Hartford Railroad Company, which is opposing in the legislature the granting of any more charters to electric lines. This poor child is crying over spilled milk. Many of its branch lines, it says, are losing from 50 to 90 per cent of all business. The reason for this loss is that the electric lines are giving better service than the steam roads. If it were otherwise, the people would not patronize them.

In Connecticut, the situation is different from that in most states. Street railway companies have been operating for years, gradually obtaining extensions as the suburbs developed, and the towns have got so close together that electric lines, with the exception of a few short gaps, are parallel with the steam road through the state. Not until applications for charters were made to the present legislature by companies for franchises in these gaps, did the steam road awake to the situation. Action was at once begun in the legislature to head off the "trespassers." Lengthy arguments were prepared to show that the street railways should not be permitted to exist, the principal reason being the great loss of earnings of the steam road on account of trolley competition. The electric roads had their turn. They were not hostile to the steam roads, but simply wanted the business that was theirs, and which the steam roads did not get anyhow, money for short trips. As for the table of losses, misleading as they were, they showed that the people want the cheap electric service. As a matter of fact, the loss was only \$48,000 a year, or about $\frac{1}{3}$ of one per cent on the entire business of the steam road.

In Pennsylvania the supreme court has decided that electric roads have no right to condemn right of way. Still the electric lines in operation have so cut into the earnings of the Reading Railroad that it has increased the number of its suburban trains and has reduced fares. The Pennsylvania company will also meet competition.

FIGHT IN CONNECTICUT.

Vice-president John M. Hall, of the New York, New Haven & Hartford Railway Company, was the first speaker. He made a long and wearisome argument, without much weight, setting forth the position of his company, which is summed up and pictorially told in the cartoon at the beginning of this article. He said in part:

"I appear here to-day with my brother, Robinson, repre-

senting the management and interests of the New York, New Haven & Hartford Railroad Company, for the purpose of offering such suggestions as appear to us reasonable concerning the pending applications for new charters and extensions of electric street railway companies. At the beginning of the discussion I desire to say that the corpora-



tion I represent is not here in the attitude of hostility to electric roads, as such, within their legitimate and proper sphere. It recognizes fully both the utility and desirability and necessity and convenience of this mode of transportation in the cities and large towns. It could not if it would, and would not if it could, put any obstacle in the way of the full development of electric communication wherever the actual convenience and necessity of the people demand it.

"Let it be understood then that the steam roads are not hostile in any manner to electric roads, as such, within proper and reasonable bounds. The time has come, however, as it seems to us, when the state should adopt some definite policy as to the regulation and restraint of electric roads within proper bounds, so that the vested rights of the steam roads may be fairly protected against unjust and unfair competition. Two years ago an electric wave swept over the state, and the legislature granted a large number of charters under which some roads have been built and many abandoned. The steam roads made no opposition to the electric schemes, except it supposed it had provided that no electric road should cross a steam railroad at grade. It was mistaken.

"The legislature thought the general law they had passed covered this ground, but our supreme court found that it did not, and the people made it the first business of this session to so amend the law that no more such death traps can be constructed in Connecticut by either electric or steam roads. No one connected with the New Haven road at the time of this wholesale grant of electric charters supposed that there was a scheme developed by the New Jersey, Pennsylvania, New York and Massachusetts syndicates, who own almost all the stock of the electric roads in this state, to parallel the Consolidated road its entire length from Springfield to New York. But if you will examine this map which I now show you, you will see that with the roads already built and with the extension now before you for action, the chain is almost complete and only a very few short links will complete it. This shows the direct purpose to parallel, not for the purpose of accommodating the necessities of the public, but to appropriate the highways of the state and to use them to compete with the costly steam roads for its entire length by an absolute system of parallelism. If it be the policy of the

state of Connecticut to make a present of the use of its highways to foreign syndicates for the purpose of interfering with the vested rights and property interests of our own citizens, it is time all our people, and especially those who have invested their money in steam railroad property or securities understood it.

"The people who have invested their money in this great property, the N. Y. N. H. & H. R. R., demand that the state shall protect their chartered rights and its pledged faith to them against a competition which is unjust and unfair and threatens to greatly impair the value of their property unless the obvious purposes of these schemes shall be checked. What would be said if the consolidated road should ask to run its trains and cars over the electric roads already constructed? Or to have the free use of the highways of the state for railroad purposes? And yet why should you deny the privilege when you propose to grant the same privilege to another class of steam roads? The disadvantages to which the steam roads are put by this new competition comes from the immense cost to which it is put, especially in the cities and large towns where the local travel is largest and the best service is demanded.

STEAM ROAD LOSSES.

"But our electric friends said two years ago this competition will not harm you. These roads will act as feeders to your road, they will increase your travel and really benefit you. We have had something more or less than a year of this experience as to the effects of electric competition where it directly parallels our road at different points between stations.

"I give you the figures from the actual business as shown by our accounting department for the last three months of the depreciation in receipt of fares which are traced directly to the competition by electric railroads where they parallel our lines between stations. I will take them in the order shown upon the statement I shall submit to the committee.

"Between Norwalk and Rowayton, a loss of 50 per cent of the entire business.

"Between Bridgeport and Southport, a loss of 80 per cent of all business.

"Between Bridgeport and Stratford, \$35 per day.

"Between New Haven and Woodmont station, 50 per cent of all.

"Between New Haven and West Haven, 70 per cent of all business.

"Between Wallingford and Meriden, 30 per cent of all business.

"Between New Haven and Lake Saltonstall, 45 per cent of all business.

"Between Meriden and Yalesville, about 90 per cent of all business.

"Between Southington and Plantsville, practically all the business.

"Between Unionville and Hartford, 40 per cent of all business.

"Hartford and Glastonbury, 30 per cent of all business.

"Between Derby, Ansonia and Birmingham, 90 per cent of all business.

"Between Ansonia and Derby, \$1,500 a year.

"Between Naugatuck and Waterbury, \$300 a month.

"Between Union City and Waterbury, \$170 per month.

"Between Waterbury and Naugatuck, 90 per cent of all.

"Between Winnipauk and South Norwalk, 50 per cent.

"Between South Norwalk and Winnipauk, 90 per cent.

"Between Norwalk and Rowayton, 50 per cent.

"Between Danbury and Bethel, 75 per cent of all business."

DISCOVERS A REMEDY.

"What is the remedy? To my mind it is to confine electric railways to their legitimate limits as street railroads. What was the original conception and design of a street railway? Was it not designed and intended simply to take the

place of the omnibus or the hack or the barge? And to be used simply as a cheap and convenient conveyance within the city or town? The street railway was never designed or intended to furnish transportation from one city to another. All the old horse railroad charters in this state which have recently been galvanized into new life and energy by the infusion of the electric current were granted by the state with no thought that they were to exist or operate beyond the limits of the town in which they were located. This is the proper limit within which this style of transportation should be confined. The city or large town and its immediate suburbs should be the extent to which street railway companies should be limited, and this only where there is a public necessity and a general demand for the convenience by the people who reside in these suburban resorts and never against their protests.

ELECTRIC ROADS HAVE THEIR SAY.

Edwin B. Gager, Derby, spoke in behalf of the electric roads as follows:

"It is now something over a month ago that the officials of the Consolidated Road served notice upon the street railway companies of Connecticut that the granting of any franchise to operate street roads parallel to the lines of that great corporation would be opposed before your honorable committee, and that at a future day the reasons for such opposition would be presented. At once the machinery of this corporation was set in motion to draw maps and compile statistics, and its able and eloquent vice-president has appeared before you with a carefully prepared statement and has presented its claims for your consideration. In the most formal and well considered manner the managing powers of this corporation, representing \$38,000,000 of capital, have issued its manifesto and placed itself on record before the people of this state. The proposition made to the people of this state, if I understand it aright, is this:

'There shall be no more street railways whose operation may diminish the earnings of the Consolidated Road.'

"Thus far and no farther is the language of Vice-President Hall.

"Now what is the argument? I have studied the claims advanced by Mr. Hall with care and I confess to a feeling that the logic of the case has overpowered him and that he has argued for the street railways better than I can. Let us examine his argument fairly and in detail.

"His first proposition is that the street railways represent foreign capital and foreign syndicates, and that they 'interfere with the vested rights and property interests of our citizens.'

"But what now are the facts?"

"I have examined the sworn returns of fifteen street railroad companies on file in the railroad commissioners' office, all I could get—and the others would not materially change the result—and I find that these fifteen companies, on September 30, 1894, represented a total capitalization of \$4,577,000, of which \$1,414,000, or 30.8-10 per cent, was owned by residents of this state, and that out of a total of 612 stockholders, 423, or 69.2-10 per cent, were residents of this state. I found that eight of these fifteen companies are controlled by Connecticut capital, and of these eight distinctively home corporations six are treated by my friend as paralleling roads, while of the seven companies controlled by foreign capital but four can in any sense be called parallel.

REAL OBJECTION DISCLOSED.

"The real thing our friends object to is competition by street railways, as they say, 'cheap electric competition.' Before looking at the detail of their plaintive appeal, let us see just what the nature of this 'cheap electric competition' is. From the nature of the service it cannot extend to any considerable distances. Indeed, my friends concede this, for they talk only of loss of local earnings, loss on short trips. The steam road does not stop at every man's door; its business is of the nature characterized as through business. We may well say, paraphrasing the language of my learned friend's argument, that we have no spirit of hostility to steam roads as such, if they will stick to their legitimate sphere. Stick to your fast expresses, your through trains, your freight transportation, but don't have the affrontery to say that no one shall give the people of this state that kind of service you can't give, because while giving that service some small fraction of your local earnings may be taken away. It is simply incidental that some of these street railway lines diminish your local receipts, but the traffic taken from you wouldn't justify the construction of the cheapest street railway line in the state. And the proposition advanced to this committee is in effect that the ninety-nine persons shall be debarred from convenient, cheap and frequent service, lest you may be deprived of the fare of the hundredth man, who might otherwise travel your road. I say the nature of the service and the rate of speed of street cars necessarily prevent any competition over distances of any length. Section 13 of the street railway law of 1893 absolutely limits the rate of speed of street cars to fifteen miles per hour, and the local authorities may limit the speed still further. The railway map of the state is shaken out and the red lines denoting the street railways are shown in some instances running along by the black lines of the steam roads, and the cry of 'parallel' is raised, and the red flag of 'foreign capital' is flung out to frighten the specter away. How absurd for serious men, knowing the legal limitation as to speed, and knowing the prohibitive limitations on competitive speed imposed by the conditions of the traffic, to fly to the people's legislature for relief.

"It is idle for Judge Hall to say the street railway was not designed or intended to furnish transportation from one town to another, that it was designed simply to take the place of a hack or omnibus. The steam road was first devised only to carry coal. The old stage lines might as well have contended against the introduction of the steam car as for the steam road to protest against the street road. Gentlemen, this push forward in the line of transportation is simply one of the marks of progress of the day, and if you will not give free scope for this progress, those who come after you will.

I have no hesitation in saying to this committee that whenever you find that a street road will not furnish more frequent transit, in a more convenient manner, at a cheaper rate, in that case there is no call for a street road, and two corporations ought not to be given franchises to do the same work which one can do as well so long as the one is reasonable in its service and charges. No one wants to build a street road through the "desert wastes" Judge Hall talks of. We want to build, and ask permission to build, where and only where there are people to be served, as the steam roads cannot, by any possibility, serve them.

LOSS TABLE DISSECTED.

"But let us turn now, for a moment to the specified illus-

trations of loss given in my friend's argument. I cannot analyze them all. A few specimens will stamp the whole.

They say "between Norwalk and Rowayton a loss of 50 per cent of the entire business." I find from their own figures, distance $4\frac{3}{4}$ miles. Electric, 5 and 10 cent fares; ten minutes service. The time table gives fifteen east bound trains and twelve west bound trains stopping at Rowayton daily. That is, the electric road gives not less than eighty-four trips, while the steam road gives but twenty-seven. The electric takes the passenger at his door and lands him right at his destination. Moreover, the loss is given in percentage. My friend don't tell how many people they actually carried between these points. But I venture to say the street road is carrying twenty times the people on this line that the steam road ever carried between these points.

"'Bridgeport and Southport, a loss of 80 per cent,' they say. Southport has twelve east bound trains and eleven west bound trains daily. The street road gives 14 and 20 minutes service.

"'Bridgeport and Stratford, \$35 per day,' they say. Stratford has on the main line and the Naugatuck division seventeen west bound trains per day and nineteen north bound and east bound trains. The electric gives a 10 minute service.

"'Waterbury and Naugatuck, 90 per cent of all business.' Naugatuck has seven south bound trains and six north bound, while the street road runs under 12 minute headway.

"Between Wallingford and Meriden, 30 per cent of all business.' Wallingford has nine north bound trains and eight south bound, while the street cars run under 30 minute headway.

"Derby, Birmingham and Ansonia 90 per cent of all business.' Between Derby and Ansonia there are eight trains each way, for the Derby and Naugatuck divisions run on practically the same time table, while the street road gives a $7\frac{1}{2}$ minute service between the two villages. Their figures are for the past three months. But our road has been running for eight years. I believe the figures are untrustworthy. And now we come to Winnipauk and South Norwalk—50 per cent less one way and 90 per cent the other. Let me read from their statement filed with the committee:

"The business of Winnipauk was very small to start with, but has been still further reduced by electric competition. Twenty-two passengers were carried in 1893 during the month of December, and eight during the corresponding month of 1894, from South Norwalk to Winnipauk, and from forty-two to one from Winnipauk to South Norwalk."

"So I might go through the list, but time forbids. Gentlemen, I cannot put in a stronger argument for the public convenience and necessity of these lines than the elaborate tables filed by my friends, supplemented by their general time-table and rate schedule. Let me read (reads from schedule). These tables show, in part, why some of their local traffic is taken. The steam roads are behind the age in the matter of local transportation and every man on this committee and in this legislature knows it.

"Now, what does all this amount to? My friends say in one of their reports filed with you that it means an aggregate loss of \$4,000 per month on local fares, or a grand total of \$48,000 per year on a total passenger income of \$12,971,000, or a loss of about one-third of 1 per cent—the 'velvet of profit' that my friend Robinson tells of. And how does this loss affect the road? I am informed that during substantially this three months its stock has risen

from \$175 to \$195. If I am wrong my friends will correct me. I find that this company paid last year \$3,631,000 in dividends—almost 10 per cent on its capital stock. Here my friends come up and ask the protection of the general assembly because there is danger that local fares to the extent of one-third of 1 per cent on passenger earnings may be lost, while they are paying 10 per cent dividends, and the capital stock has risen from \$175 to \$195. But let me read again from their report: The figures “show a loss of \$4,000 per month on local fares, notwithstanding the general business of the road has increased.”

“I told you Judge Hall had argued our cause. Increased convenience of access to the stations of his road increases the through travel, more than compensating for the loss on local fares. Of course, gentlemen, there is no question about the roads already chartered. ‘Thus far and no farther’ is the fiat of the Consolidated road. The argument from results already obtained is made for application to pending charters. Doesn’t it prove that you should be liberal to these roads and to the people of the state in this matter of cheap, convenient, local transportation, and that free play should be given for the application of the principle of public convenience and necessity. The fact is, my friends are not willing to rest their opposition on this ground. They wish to prevent the people of this state from getting what public convenience and necessity call for.”

POSITION OF ELECTRIC ROADS.

“I have already mentioned the street railway law of 1893. Street railway men recognized the possibility of a parallel and did not wish to interfere with the vested rights of any corporation. We met the representatives of the Consolidated road at New Haven and agreed upon a means of settling that question without turning the committee into a court to determine facts. All parties agreed upon section 8 of the street railway act of 1893 as the fair settlement of the question so far as legislative action was concerned, in part as follows:

“‘No street railway shall hereafter be built or extended from one town to any other town in the public highways, so as to parallel any other street railway or steam railway, unless by special charter prior to January 1, 1893, until the company desiring to build, construct, or extend such railway shall have applied to the superior court or any judge thereof, and shall have obtained from such court or such judge, in the manner hereinafter required and provided, a finding that public convenience and necessity require the construction of such street railway.’

“We don’t ask to be relieved from that act. It is fair to the steam roads, fair to the street roads, and above all, fair to the people, for it is their use which determines the question; and I affirm that any steam road which seeks to retain an advantage at the expense of the public convenience and necessity of the people, determined by so competent a tribunal as our superior court, is seeking what is unfair, what is oppressive to the people and what justifies the feeling sometimes expressed that the state of Connecticut is to be handled for the benefit of the Consolidated road. If you depart, gentlemen of the committee, from the straight road of fair play on the question of public convenience and necessity you can justify your conduct neither to your own conscience nor to the people of the state.”

So far the question remains unsettled, the committee will consider the arguments and report to the legislature.

RECEIVER FOR MATHER ELECTRIC COMPANY.

Owing to inability to collect accounts the Mather Electric Company, Manchester, Conn., has been put in the hands of Charles M. Jarvis, receiver. By order of court the company is allowed to proceed with the manufacture of electrical apparatus to close out the large amount of material on hand, nearly all of which is sold. All supplies received after 10:10 a. m., April 6, will be paid for by the receiver, but everything received prior to that hour will be credited on the accounts of the Mather Electric Company. An inventory is being taken, and it is believed the receivership will be only temporary.

ECHO OF THE BROOKLYN STRIKE.

The trial and acquittal of Benjamin Norton, president, and Daniel J. Quinn, superintendent of the Atlantic Avenue Railroad Company, on the charge of violating the ten-hour labor law, is the closing chapter in the story of the strike at Brooklyn, N. Y.

The evidence upon which Mr. Norton was indicted by the grand jury was furnished by Jerry Desmond, an ex-motorman, and James Dwyer, an ex-conductor on the Atlantic Avenue line.

No other course was left to the jury, in view of the charge of Judge Moore, which was, in part as follows:

“The companies and their employes had a constitutional right to enter into a special agreement in regard to the ten-hour provision. That such an agreement was in existence is clear from the evidence. This contract expired on January 1, 1895, but no complaint or refusal to continue work under the old agreement was made known to the company until January 12, 1895. The law regards an implied agreement to continue under an old contract after its expiration, providing no refusal is made on either side. If Desmond acquiesced or concurred for a long time to work on the basis that the ten-hour clause meant actual running time, exclusive of stops at termini and meal times, then there was no exaction by the company on January 12, 1895, and no cause for conviction of the defendants.”

JEWETT CAR COMPANY REORGANIZED.

The Jewett Car Company, of Jewett, O., has been reorganized, and a number of men of means have taken hold of the business, which they propose to push vigorously. The shops will be fully equipped with the latest improved machinery, and placed in position to handle a good output expeditiously and economically.

The location of the factory in one of the best timbered sections of the state, enables the use of the best materials at reasonable figures. A well known and practical builder from one of the large concerns has been secured to superintend the works, and the management confidently anticipates a profitable and extensive business.

STIRLING, GRANT & CO.

Two well-known street railway men have recently formed a partnership to engage in the supply business in Detroit, and on account of the fact that they have both been street railway officers for several years, and because of their personal worth we anticipate for them a prosperous future. The firm name is Stirling, Grant & Co. They will be general contractors for street railway construction and equipment and will deal in general railway supplies.

J. R. Stirling was born in 1851 and has been a life long resident of Detroit. For several years past he has been secretary of the Detroit Citizens Street Railway. He took charge of the financial, accounting and purchasing departments at the time the road was bought by



J. R. STIRLING.

JOHN GRANT.

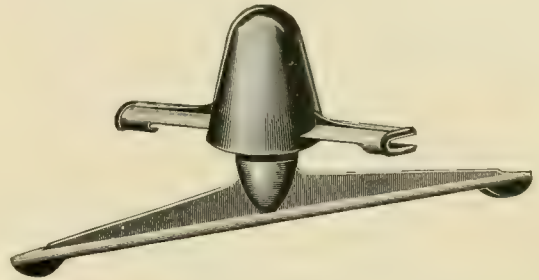
H. B. Ledyard, D. M. Ferry, Geo. H. Russell, M. J. Smith and other local capitalists. For years he was secretary of the park commission, of Detroit, in which position he did an immense amount of work and proved to be an able manager.

John Grant, the other member of the firm, has been for eight years in the service of the Detroit Citizens Street Railway, and when he resigned April 1 occupied the position of assistant superintendent. He began as a clerk to the late Robert Bell, superintendent of the Detroit Street Railway. Two years later he became superintendent of the Grand River Avenue line. When the consolidation took place in 1891 he took the position he has just resigned. Mr. Grant is also a native of Detroit, being born there in 1861. Both gentlemen are exceedingly popular among the street railway fraternity, and cannot fail to make a splendid success in their new undertaking.

The REVIEW knows of a first-class street railway plant which the owners desire to sell, as they have other business requiring their attention. They will sell the plant outright, or operate it in connection with a capitalist, who is a hustler and thoroughly understands street railway business. Address B & C, STREET RAILWAY REVIEW.

BADGER TROLLEY BELL AND SECTION FUSE BOX.

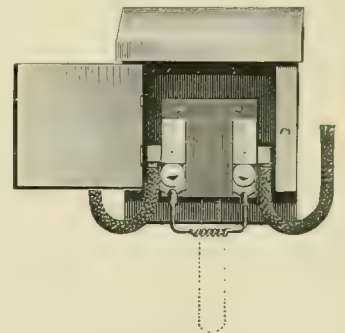
Those who have used the W. E. hanger will recognize it in an improved form in the illustration of the Badger trolley bell. It is so designed as to protect the cap holding the insulated stud from the weather, and securely



BADGER TROLLEY BELL.

lock it. It is said to be impossible for the jarring from the trolley to loosen it. These trolley bells are made for span wire or bracket arm construction and studs will be furnished to fit any style of clamp.

The Badger section fuse box is placed between section insulators, or circuit breakers. It is supplied with a light fuse, by means of which an equal E. M. F. is said to be maintained all over the system, and one feeder will assist the other in overcoming heavy loads, yet the independence of each feeder is not disturbed, as the light fuse will blow in case of a ground, or a trolley wire break. This device can also be used for a feeder box, the fuse of the same capacity as the feeder being used. The Metropolitan Electric Co., Chicago, is the selling agent for these specialties.



BADGER SECTION FUSE BOX.

REORGANIZATION COMPLETED AT LOS ANGELES.

The Los Angeles Railway Company has lately been incorporated to carry out the plan of reorganization as announced in the REVIEW. The \$3,000,000 of bonds and \$6,000,000 of stock of the Los Angeles Consolidated Electric Railway Company have been absorbed by the new company. The directors are Thomas Brown, of the Bank of California; Lovell White, of the San Francisco Savings Union; Antoine Borel, banker; George Stone, of the People's Home Savings Bank, San Francisco; and J. D. Bicknell, capitalist, and M. H. Sherman, both of Los Angeles, Cal. F. W. Wood has been elected general manager. Thomas Brown is the new president and A. L. Burke, secretary. The new company will pursue a vigorous policy.

PERSONAL.

C. T. Powell, formerly of Sioux City, is master mechanic of the South Chicago City Railway.

Elmer P. Morris, of Morris & MacCurdy, Indianapolis, was a welcome visitor to the REVIEW.

W. Frank Carr, formerly superintendent of the Roanoke, Va., Street Railway, is now in charge of line construction on the West Chicago Street Railroad.

Herbert W. Pool, business manager of the National Car & Locomotive Builder, New York, was in Chicago recently and stopped in at the REVIEW office.

F. A. Estep, president and treasurer of the R. D. Nuttall Company, Allegheny, Pa., was in Chicago recently and made the REVIEW a pleasant visit.

C. D. Wyman, general manager of the Milwaukee Street Railway Company called on the REVIEW while in Chicago a few days ago.

George W. Henry, the pushing western agent of the Steel Motor Company, Cleveland, O., made the REVIEW a pleasant call. Mr. Henry has established himself in a new office, Room 210, 36 La Salle street, Chicago.

B. B. Gillman has resigned the general superintendency of the New Orleans, La., Traction Company, much to the regret of the employees, with whom he was very popular.

Albert E. Butler, the able secretary of the Massachusetts Street Railway Association, on March 20, took his own life. His rash act is deplored by his street railway associates and the people of Lawrence, Mass., where he was cashier of the Arlington bank.

B. F. Harris, Jr., of the Urbana & Champaign, Ill., Electric Street Railway Company, has returned to Champaign after an absence of four months. Mr. Harris was completely worn out by close application to his duties as president and general manager, and left home last November, going to Asheville, N. C., and later to the Bermuda Islands, seeking relaxation and change of scene.

John W. Carter, division superintendent of the Ninth Street Cable Railway, Kansas City, Mo., was injured by a peculiar accident, escaping instant death by the merest chance. The cable at the foot of the Ninth street incline had been giving trouble that morning, and Mr. Carter was peering down into the slot to observe its running, when suddenly it slipped off the depression pulleys and flew up through the slot, which is very wide at that point, and struck him directly under the chin. He was knocked down and for a few moments was rendered unconscious. Had not the slot rails somewhat broken the force of the blow, it would have proved more serious.

Frank A. Morrell, who for the past six years has been connected with the Lewis & Fowler Manufacturing Company, of Brooklyn, N. Y., as sales agent, has severed his connection with that company, and is now engaged as sales agent for the New Haven Car Register Company, of New Haven, Conn. He now has to offer an excellent fare register and a fine line of register and car trimmings, which he hopes will merit the favor of his former patrons throughout the country, all of whom will wish the genial "Frank" a full measure of success.

Charles C. Upham, who for four years has so faithfully and ably served the Lincoln, Neb., Street Railway as treasurer, and later, as vice-president and general manager, having completed his contract has withdrawn from the company. Mr. Upham has made a fine record in the face of unusual discouraging conditions. His experience has been wide, having been chief engineer of the northern division of the Mexican Central, chief engineer of the Chicago, Burlington & Northern, and superintendent of the Illinois lines of the C. B. & Q. He also built and was general manager of the Salt Lake Rapid Transit, which position he left to go to Lincoln. It is to be hoped he will continue in street railway work. Mr. Upham made a gallant but ineffectual struggle to save the road, but the terrible depression in Nebraska made it impossible. The receiver at first appointed was the president of the company. He remained receiver, however, only four days, when he was removed and the judge of the United States court for the district appointed a man of his own selection to that position.

NEW YORK LAW ON MUNICIPAL OWNERSHIP.

The acquisition of street railways by municipalities is made easy by the bill which recently passed the New York State Assembly. Mr. Conkling's bill allows the question of municipal ownership of street and elevated roads to be submitted to the vote of the people in any town or city of the state. This law cannot be condemned too strongly, as placing it in the power of political pirates to levy tribute on railway companies. To the political "boss" the prospect of having his patronage and vote-controlling power increased fourfold certainly must be enticing. To the public the results would be far from what they had been led to expect by the promises of office-seeking demagogues. To the tax payer municipal ownership means increased taxes, and to the riding public, a poor service, filthy cars and insolent employees. Fortunately for us all, the American public knows too much of municipal politics to further enlarge its opportunities, and will think twice before hazarding the excellent service given at moderate cost by our private corporations.

W. B. Crane & Co., Chicago, report a good demand for oak street railway ties. The company has a good stock of high grade ties, and is in position to make prompt shipments.



The Baltimore Car Wheel Company will furnish the trucks for the Orleans Traction Company, New Orleans.

Ford & Co., Mansfield, O., have turned out several closed and open cars now running in that and neighboring cities.

The LaClede Car Company, St. Louis, has completed an order of forty summer cars for the Buffalo Railway Company.

Morris Tasker & Co., of Philadelphia, have received an order for 200 iron poles, from the Manchester, N. H., Street Railway Company.

The Hogan Boiler Company, Middletown, N. Y., gave a reception to representatives of the trade press, engineers and steam users, at its works, on April 9.

The R. A. Crawford Manufacturing Company will equip all the cars of the City Railroad Company, Dayton, O., with its No. 1 fender. Many inquiries are being received.

The H. W. Johns Manufacturing Company, New York and Chicago, has closed contracts for all the overhead material for the Detroit & Mt. Clemens Electric Railway Company.

The Scarritt Furniture Company, St. Louis, Mo., was given the contract recently for cross seats for 75 cars of the Detroit, Mich., Railway Company, and is working on a number of other large orders for cross seats.

The John Stephenson Company, Limited, of New York, has received a large order for open cars from the Detroit, Mich., Citizens' Railway Company, and from Bridgeport, Conn., and Newark, N. J., besides a number of scattering small orders.

General Manager Wyman, of the Milwaukee Street Railway, has let the contract for twelve handsome new cars which will be built by the Pullman Company. They will be mounted on McGuire suspension trucks and equipped with G. E. 800 motors.

J. Holt Gates has sold five 100-K. W. multipolar Mather Electric Company generators, with station equipments, for the Indiana Electric Company, Goshen, Ind. Mr. Gates met strong competition which was conquered by his great ability as a salesman.

F. E. Donohoe, of the American Electrical Works, has been ailing with the grip for several weeks. Although he has been unable to be at his office every day, he has

been able to secure some fat orders from new roads and his old customers have not forgotten him.

The New Process Raw Hide Company, of Syracuse, N. Y., has issued an 1895 price list of its raw hide gears, now so well and favorably known in electric street railway work. Prices are given on finished blanks and complete gears of 2 to 15 inches diameter and 1 to 10 inches face.

General Manager E. J. Wessels, of the Genett Air Brake Company, 33 Wall street, New York, has issued in neat pamphlet form the paper on air brakes for street cars, read by him at the last national street railway convention, at Atlanta. A copy will be mailed free to any address on application.

The Mica Insulator Company, of 218 Water street, New York, is sending samples of micanite insulation to its customers. As now made the micanite plate is lighter in color, almost transparent, showing a smaller proportion of cement than heretofore. From this plate are made commutator segments, rings, etc. The improvement is due to special machinery and better methods. The company's business has grown steadily from the beginning, and soon will require an increase in capacity.

The Heine Safety Boiler Company, of St. Louis, Mo., feels much gratified over its success in New Orleans, La., and it certainly speaks well for the Heine boiler, that both the St. Charles Street Railway Company and the Orleans Railway Company picked out that boiler for three equipment. The Heine Company has sold these 250 horsepower boilers, to replace another type in the Equitable Building, Denver, Colo., and three 210 horsepower boilers for the building of R. H. White & Co., Boston, Mass.

George B. Mallory, engineer and naval architect, 106 Produce Exchange, New York, has gone into the business of building street railway power plants and contracting in all branches of electric railway work. Mr. Mallory has been a specialist in electric transmission for many years. He has designed and superintended many important works, among them being Dow's stores, the largest grain elevator in the world, Watson's elevator, Brooklyn, Central stores, New York, piers 25 and 27, North River, iron freight sheds, S. S. Susquehanna, Anchor Line Buffalo, S. S. Owego, Erie Railway Company.

The Wallace Electric Company, Chicago, feeling the need of larger quarters, is fitting up the main floor of 305 Dearborn street, extending through to Plymouth Place, and will be established there on and after May 1, with a high grade stock of electric railway supplies, including Wood's overhead material, Habirshaw wire, Whittingham electric heater, W. T. Macallen Company's electric railway specialties, Boston incandescent lamps, Electric Selector & Signal Company's apparatus, Iona

specialties, Wallace railway specialties, etc. A number of large sales have been made to electric railway and lighting companies.

Metropolitan Electric Company, Chicago, has been appointed agent for the Solar arc lamp, a lamp said to be of unusual merit for incandescent circuits. Its feed mechanism is so simple and adjustable that it has been found to be a thoroughly economical and practical lamp. It is simple in construction, and has a positive action of feed; no springs or dash pot, no see-sawing. The lamp is manufactured plain or in various styles of ornamentation to meet the requirements. Samples are being exhibited at the warerooms of the Metropolitan Electric Company, 186 and 188 Fifth avenue, where they will carry a stock for immediate shipment.

H. E. Collins & Co., Bank of Commerce building, Pittsburg, sole sales agents for the Cahall vertical water tube boiler, manufactured by the Aultman & Taylor Machinery Company, of Mansfield, O., have sold recently to the Inland Steel Company, of Chicago Heights, a 300-horse-power boiler, which is the second order received from the Inland Steel Company. They have sold 400-horse-power to the Shoenberger Steel Company, of Pittsburg, which is their fourth order. Collins & Co have also sold 500-horse-power to the Michigan Alkali Company, at Wyandotte, Mich. The 2,000-horse-power of Cahall boilers installed at the Carnegie gas pumping plant, at Bagdad, Pa, was put in operation within the last ten days, to the great satisfaction of all parties concerned.

The R. A. Crawford Manufacturing Company's works at Pittsburg, were destroyed by fire last month. With characteristic energy the company in three weeks had removed to Philadelphia and started new shops, in operation at 1906 and 1908 Market street. The company is receiving inquiries for its fender from all parts of the world. Orders for the Unity fender were received during March, from the Philadelphia Traction Company; Atlantic Avenue Railroad Company, Brooklyn; and Danbury & Bethel, Conn., Horse Railway Company; the latter for a folding pick-up fender of design No. 1. Seven other railways are testing the fender and about to order. The company has just issued a handsome catalog, showing 18 designs of its fenders as they would appear on cars. A small pamphlet is published in connection with the catalog, called "Facts about Accidents and Fenders on Street Cars," which should be in the hands of all managers.

The Chicago office of the Edward P. Allis Company has closed contracts for the following engines: Two 28 and 52x48 tandem compounds 1,200-horse-power each, direct connected to Siemens & Halske 1,000-K. W. generators, Detroit Citizens Street Railway Company; two 24 and 48x48 direct connected to Walker Manufacturing Company 750-K. W. generators and two

20 and 40x40 direct connected to 400-K. W. Walker generators, Detroit Railway; 22x42 for Cleveland & Elyria Electric Railway Company; 4 same size, Akron, Bedford & Cleveland Railroad Company; one 2,500-horse-power, consisting of a pair of 36x60 engines to drive 1,500-kilowatt generator, Union Depot Railroad Company, St. Louis; one 24x48 engine to drive 200-kilowatt G. E. generator, direct connected; 20 and 32 x 60 heavy frame cross compound engine to the El Paso Electric Light Company, Colorado Springs; 14 x 36 girder frame engine to Wendell Manufacturing Company, Chicago. The Milwaukee office sold two cross compounds to go to New Orleans.

Although only born in 1870, Samuel L. Nicholson has had 7½ years in the electric railway business. At the



age of 18 he went with the Sprague Company. He acted as assistant superintendent of construction of the Neversink Mountain Railway, and was interested in constructing other eastern roads. From the Sprague Company Mr. Nicholson went with the Short Company as salesman, and later as assistant superintendent of construction at the Cleveland factories. His next

connection was his present position as manager of the railway department of James Boyd & Bro., 14 N. Fourth street, Philadelphia. Here his large practical experience is valuable in his relations with his customers, as it enables him to supply their wants satisfactorily, as he has been there himself. The firm of James Boyd & Bro. is doing a large business in street railway supplies.

The Walker Manufacturing Company, of Cleveland, O., was awarded the following contracts between March 1 and March 22: Burhorn & Granger, 136 Liberty street, New York City, 2 25 kilowatt, direct-coupled, lighting generators; Union Depot Railroad Company, St. Louis, Mo., 41 double car equipments, 82 30-horse-power steel motors; Pittsburg Traction Company, Pittsburg, Pa., 1 double car equipment, 2 30-horse-power steel motors; Pittsburg, Grafton & Mansfield Passenger Railway Company, Pittsburg, Pa., 1 double car equipment, 2 50-horse-power steel motors; Federal Street & Pleasant Valley Passenger Railway Company, Pittsburg, Pa., 2 double car equipments, 4 30-horse-power steel motors; Suburban Rapid Transit Street Railway Company, Pittsburg, Pa., 1 double car equipment, 2 25-horse-power steel motors; Schuylkill Electric Railway Company, Pottsville, Pa., 4 double car equipments, 8 25-horse-power steel motors; Chicago City Railway Company, Chicago, 49 double car equipments, 98 25-horse-power steel motors, and F. E. Snow, receiver, Adrian

City Electric Belt Railway Company, Adrian, Mich., 1 60 kilowatt belted generator, 3 single car equipments, 25-horse-power steel motors.

The Jackson & Sharp Company, of Wilmington, Del., has built ten electric cars for the Hestonville, Mantua & Fairmount Passenger Railroad Company, of Philadelphia, on a 30 day's contract. The interior of these cars is finished in mahogany with head linings of birdseye maple. Nearly all the metal work is polished brass; the hardware and lamps are oxidized silver, windows and doors are glazed with French plate. Push buttons between windows enable passengers to signal the motorman when to stop. The completion of these cars in so short a time speaks volumes for the efficiency and organization of the Jackson & Sharp shops.

The McGuire Manufacturing Company, Chicago, are

Pa.; Kansas City Cable Railway Company, Kansas City, Mo.; Electric Railway, Light & Power Company, Anaconda, Mont.; West End Street Railway Company, San Antonio, Tex.; and Hammond, Whiting & East Chicago Street Railway Company, Hammond, Ind.

PICTORIAL EVENTS OF A MONTH.

Horses might run away with a car without creating much comment, but it does seem odd for an electric car to run away with itself, yet it happened near Boston. On one of the suburban lines the motorman slowed down his car without entirely shutting off the current, and got off to turn a switch. As soon as the front wheels had passed the switch the car started to spurt.

Dr. Wellington Adams, who made himself famous by projecting an elevated electric air line from St. Louis to Chicago, to run at great speed, has been obscured by the



justly elated over their success in capturing the Milwaukee order, which will be filled with the McGuire Air suspension type. The competition was strong, there being no less than thirteen bidders, and the award was made the McGuire Company on its claims for operation with minimum amount of current and cost of maintenance. The shops of the McGuire Company are working on trucks for the Kansas City & Indiana Railway Company, Kansas City, Mo.; Versailles Traction Company, McKeesport, Pa.; Danbury & Bethel Horse Railroad Company, Danbury, Conn.; Mt. Adams & Inclined Plane Railway Company, Cincinnati, O.; Electric Traction Company, Philadelphia, Pa.; Chicago City Railway Company; Tonawanda Street Railway Company, Tonawanda, N. Y.; Union Street Railway Company, New Bedford, Mass.; Los Angeles Consolidated Street Railway Company, Los Angeles, Cal.; Norwalk Street Railway Company, Norwalk, Conn.; Delaware County & Philadelphia Electric Railway Company, Philadelphia,

Interoceanic Electric Railway Company, which has been incorporated with \$200,000,000 capital, to build an elevated electric road from New York to San Francisco.

If the new speed regulation is enforced in Brooklyn, the citizens will wonder of what advantage, except cleanliness, the electric cars are over horse cars.

Two mischievous colored newsboys had great fun on a trailer one evening in Washington, imprisoning a lot of passengers and the conductor. It seems there were catches on the outside of the doors, and the boys watching their chance while the conductor was on the inside, jumped on the platforms and locked both doors.

At Manayunk, Pa., 30 tons of rock fell 30 feet to the tracks of the Manayunk Street Railway Company.

In Cincinnati we have the evolution of the tin-can-and-string-in-the-cable-slot-pastime, which has reached the lumber wagon stage.

"Horatius" Bowen protects the right of way of the Chicago City Railway from the car of the Chicago

General Street Railway Company, which tried to cross Twenty-second street bridge.

Two women and a car load of passengers at Elgin, Ill., were in a dreadful pickle. One of them had a bottle of pickles which she carefully placed on the seat. No. 2, rather heavy, sat down on them, and the vinegar found its way to the motor. The motor was burned out and the car was set on fire.

Work has been begun on Boston's subway, which no one seems to want.

STEAM RIDING GALLERY.

Few if any World's Fair concessionaires reaped such a harvest of nickels, as did the proprietors of the merry-go-rounds outside the gates. Of these there were many, and nearly all were crowded all day and far into the night. As an amusement the riding gallery stands preeminent. Young and old, of both sexes, seem to find in it a great attraction. Its suitability as a street railway attraction is quite superior to most others, as the persons who delight in riding on the gallery are the very ones that would ride in a street car.

To be permanently attractive, to induce individuals to ride again and again, the gallery should be constructed to give genuine pleasure to the rider. This point has been considered by the Armitage-Herschell Company, of North Tonawanda, N. Y., in designing its new and

improved form of riding gallery, of which an illustration is given herewith. Each horse has a rapid, yet easy galloping motion. No iron rods hang in the way of the rider. The horses are 24 in number, carved and mounted by the best workmen in the country, so as to give an appearance as realistic and lifelike as possible. Following every three pairs of horses are finely upholstered carriages and chariots with seats for four persons. The frame of the machine consists of 16 sweeps, radiating from an iron hub, thoroughly braced. Every piece is carefully numbered to reduce the work of erecting. An electric motor will operate the machine as well as and more economically than a steam engine. An organ and image are furnished with every complete equipment. Every street railway pleasure resort should have a riding gallery in its list of attractions.

W. L. Brockway, of Woburn, Mass., died, March 9, after an illness of only two days. He was superintendent of the North Woburn Street Railway Company for the past three years, and for 20 years preceding had been in the employ of the Lynn & Boston Railroad Company. Mr. Brockway was a typical Vermonter, and was well liked by all who knew him.

THE ACCIDENTS OF LIFE



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CORRESPONDENCE

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

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NO. 5

It does seem hard for some papers to tell the truth, but the St. Louis Chronicle evidently believes in telling a big lie or none at all. It recently bemoaned in an editorial the death of "3,000 persons killed in two months" on the electric and cable roads of New York and Brooklyn. If one of the motive powers of St. Louis, thus defamed, does not run over this modern Ananias it will be a wonder and a mistake.

It is with sincere grief that we are called upon to chronicle the death of William J. Richardson, who had, perhaps, the widest acquaintance with street railway men of anyone in the United States. Mr. Richardson's life was cut off with an attack of spinal meningitis, caused by mental worry. His death will be lamented by the fraternity, which appreciates his faithful and valuable services as secretary of the American Street Railway Association since its beginning, and his noble qualities as a man.

EVERY street railway which maintains a park should endeavor to extend its earning capacity to a wider than the mere local field. This can be done by making it attractive for excursions from out of town points, and religious, commercial and political conventions. Arrangements can be made with steam roads for excursion rates, so that crowds can be brought from a distance for a com-

paratively nominal sum, which shall include transportation both ways, street car fare, and admission to the grounds. By cultivating this feature, a never ending source of summer revenue is assured. Of course it is necessary to have something to attract excursionists, and it must be well advertised so they cannot fail to learn of it and desire to come.

THE street railway business, as we have frequently remarked, is one of the most accurate and speedy indications of improvement or decline in the general business of the country. Street car revenues are the first to feel the effect of unemployed labor, and the first to welcome its return to prosperity. The present condition, therefore, of the street car factories, most of which are brim full of orders for new cars, many of which cannot possibly be delivered inside of three months, is positive evidence of returning good times, with the consequent increased activity in all branches of trade.

It is difficult to understand what the members of families of the unfortunate victims of trolley accidents in an eastern city expected to gain by putting themselves on exhibition on the platform of a public hall. They could not bring back the dead to life, nor restore the amputated limbs. Their presence simply served to please the morbid curiosity of some common people, who have nothing else to do but foster sensationalism. It was an unseemly exhibition, and should never have been permitted to take place, as it could have been prevented had the newspapers done their duty by condemning instead of agitating for such a gathering.

OTTAWA, Illinois, citizens would like an electric railway to Starved Rock, a picturesque spot near the city. Ottawa, Ill., is the city that compelled the owners of its street railway to abandon the service, because her citizens would not patronize the road enough to secure revenue sufficient to pay interest on its bonds. If a road were built to Starved Rock, it would get ten or fifteen passengers on a pleasant Sunday, and none the rest of the week. The people are accustomed to use farm wagons, or the tow path when they go to Starved Rock, and the expenditure of much money has demonstrated that they do not change their habits.

THE use of the motors as dynamos for braking purposes on grades, seems to be attracting increasing attention. The principle has been known for years, but never has been very extensively applied in actual service except with auxiliary appliances. We believe the first application of this kind of brake to cars in regular service was made on the Riverside Park Railway, of Sioux City, under the direction of B. J. Jones, who was, at the time, with the Westinghouse Company, and was installing electric traction on the system. It was first put on a car of that road in September, 1890, and was soon after put on other cars of the same road. About a year after, I. B. Walker, of the Sioux City Street Railway, began

to equip the cars of that line with a similar device. Recently the North Hudson County Railway, of Hoboken, N. J., has been putting on this kind of brake under the direction of its electrician, A. K. Bonta. Such experiments are watched with interest.

THE present month marks the opening of the Metropolitan West Side Elevated road, of Chicago. It is not only the first electric elevated road in this country, but is probably the most complete rapid transit system in the world. Its structure and entire equipment is generally admitted to be the best yet used on an elevated road. Although it is only a year since active preparations were made for the use of electricity as a motive power, work has been pushed so rapidly that passengers were carried May 6. At the same time the electrical work has been done with the same thoroughness that characterizes the mechanical work on this road, and the management is to be congratulated on the freedom from annoying accidents and delays which sometimes are recorded at the opening of a road. All eyes have been on the Metropolitan for the past year, and we take pleasure in giving this issue a complete description.

MAIL service has been inaugurated in Boston and will be in operation in Chicago within a few days. The government really means business in the street railway branch of the postal service. Extensions will be made to all the larger cities as soon as possible, and interurban service will come later. A standard car has been adopted for the service, which is described and illustrated elsewhere in this issue. It is the same as the standard for steam roads, except that it is on a smaller scale. This is another pet of the REVIEW in the direction of increased efficiency of street railway service. We hope to see the rapid extension of this service to all cities and to every street railway line in this country. Letters mailed in St. Louis after noon, for local delivery, are received by the proper person next morning, while a letter mailed in the same box at the same time is delivered in Chicago the next morning, only a few hours later than its companion in St. Louis. The same thing is also true with reference to letters mailed in Chicago. It is to shorten up the time of local deliveries that the mail service is extended to street railway lines, and it should be appreciated by the public.

IN another place in this issue of the REVIEW will be found an account of an ambulance corps of the tram roads of New South Wales. While it is not necessary in this country, especially in the larger cities, to have such an elaborate equipment, there are some features of the service that could be adopted with profit by American street railways. It would not take much space to carry bandages and remedies needed in cases of personal injury. The motorman or conductor could, without much trouble, be instructed to give proper attention to the victim, which would give such temporary relief that the patient would be in better shape when he reaches

the hospital than he would be without such attention. The early stoppage of the flow of blood, and the restoration of one who is unconscious may save a death claim. On electric lines conductors and motormen ought to have a knowledge of some method of artificially producing respiration, to be administered in case of an electric shock. It would not be advisable for companies to go to much expense in these directions, as a physician should always be called, but it is important to give temporary aid to the injured as soon as possible.

It will be a sad day for street railway companies if the doctrine which the Chicago General Railway Company desires to have established is confirmed by the highest court. The result will be that anybody who has money enough to secure the incorporation of a company, and sufficient credit to obtain a car or two, can have the use of track that has cost another company money that was cast upon the waters, as it were, with the hope that it would return after many days. With many companies the bread is either floating or has sunk, never to be recovered. It does not seem just nor equitable that a street railroad which has been in operation for many years, taking all the risk, building expensive tracks and rolling stock, thereby developing the traffic, only to have some upstart come in and rob it of what it should rightfully enjoy. The argument of the Chicago General Company is printed elsewhere. Some novel points have been raised, but its position cannot be maintained with justice, for it is in conflict with fundamental principles that have been established for hundreds of years, and one is that a person cannot give away the same thing more than once unless it has been returned.

BICYCLES have cut into the business of the street railways in all cities, but it is the smaller roads that feel the competition the most. Liverymen whose swift steeds do nothing but stand in the barn, feed and brush away the annoying flies, are putting in a stock of bicycles for rent. New, high grade wheels, if bought in quantity, will cost about \$75 each, with 60 days before payment is required. A wheel ought to earn at least a dollar a day, and it doesn't cost much for repairs. Second hand wheels can be bought for \$15 and upwards. It might pay some roads in the smaller cities to put in a few wheels for hire. Bicycling has got beyond the fad stage and has come to stay. If it has a bad effect on business, something must be done to counteract it, and produce revenue in some other way. Why not use the bicycle itself? Any company that has the room, can build a quarter, third, half or mile bicycle track at small expense. Races can be promoted in which amateurs will be only too glad to ride for cheap medals, and occasionally professional events can be added as special attractions. Well advertised, and the spirit of competition aroused in the contestants, so that speedy races are put up, the events will draw a large number of people. Most of them will use the cars to reach the track, and a small admission fee can be easily secured, if the sport is good.

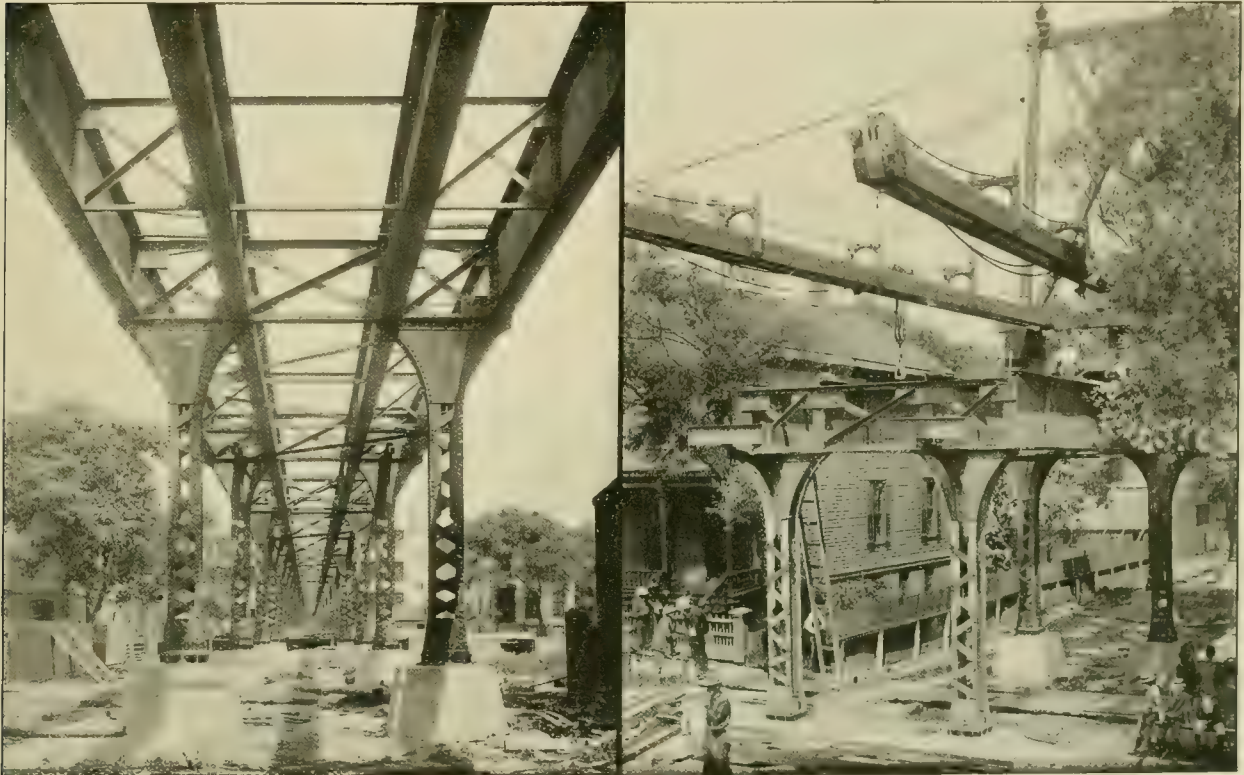
THE METROPOLITAN WEST SIDE ELEVATED RAILROAD OF CHICAGO.

The Finest Elevated Road in the World—Widest Application of Electricity Yet Made in Railroad Practice—An Unequaled Rapid Transit System.

Like many other large enterprises, the construction of the Metropolitan West Side Elevated Railroad of Chicago was begun in a very quiet and business-like way. The ordinance giving it the right to cross streets was put before the city council in February, 1892. April 7, of the

schemes, among which it was impossible for the public to tell which was the genuine. The company went at once to work, however, through its right-of-way agent, Hermann Benze, to secure the right-of-way, and it was soon found that there was an abundance of money back of the undertaking.

The road drew for its construction funds on the wealth of millionaires in London, New York and Boston. It is not often that a railroad of any kind has been as unhampered by financial matters as has the Metropolitan Elevated. Everything that has been done has borne the

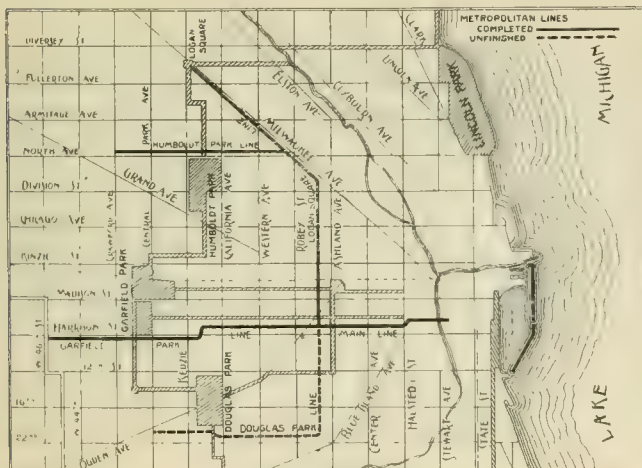


UNDER CONSTRUCTION.

same year, it was signed by the mayor. The ordinance did not attract much attention at the time because it was only one of several dozen west side elevated road

marks of practically unlimited financial resources and a broad gage policy.

The entire right of way, except, of course, the street



TRAIN AT STATION.

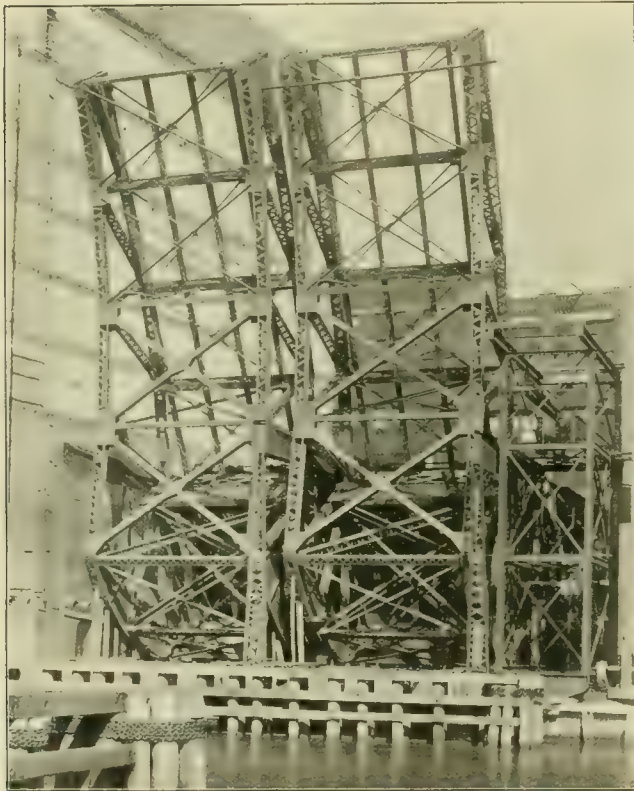
crossings, has been bought outright, in the same manner as the ordinary steam road. Whenever possible, also, the owners of adjoining property have been paid damages

in advance, and they have signed agreements to relinquish all claims for damages incident to the construction and operation of the road. The company has thus secured practical immunity from what has on some elevated roads proved to be a great source of expense. No other elevated road yet built in this country has pursued this policy of buying its entire right-of-way.

The actual work of construction was carried on by the West Side Construction Company, a corporation having the same officers as the railroad, with E. W. Eckert as chief engineer. This company gave the contract for the iron and steel of the structure to the Carnegie Steel Company, of Pittsburg.

LINES AND TERRITORY.

Starting at the down town terminus at Franklin street, half way between Van Buren and Jackson streets, near



ROLLING LIFT BRIDGE UNDER CONSTRUCTION.

what might be called the southwest corner of the heart of the city, the road runs west about half a mile and turns south just east of Halsted street. In that half mile are crowded a number of structures of the greatest engineering interest. The terminus between Franklin and Market streets occupies the lower floors of two six-story buildings. One of these buildings fronts on Franklin street and the other on Market. Exits are provided for both streets. After leaving the terminal at Market street, a four-track structure runs west one block to the river, over which it crosses on a mammoth four-track rolling lift bridge. Just west of this bridge comes a viaduct of two spans, over the Pennsylvania Railroad freight yards and the approach to the Union Depot train shed.

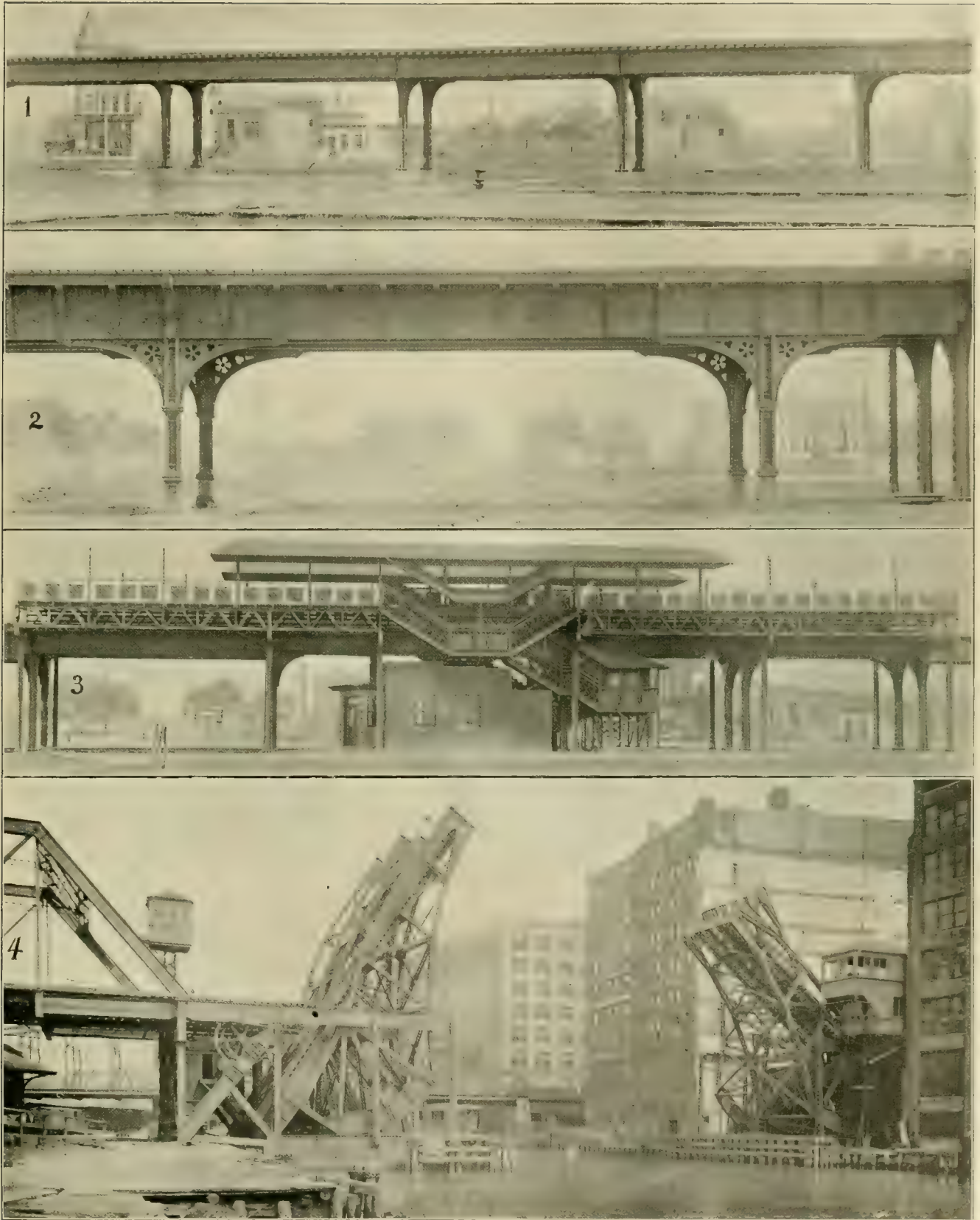


VIADUCT AT UNION DEPOT.

Just east of the bridge, and also just west of the bridge, are complete sets of interlocking switches, controlled from towers, so that trains can be run from any one of the four tracks onto any other. The road turns south one block near Halsted street, and again takes a course due west between Van Buren and Congress streets. At Marshfield avenue, $1\frac{3}{4}$ miles west of the down town terminal, the four-track structure ends and three double-track lines diverge. The south or Douglas park line is not yet completed. It will run south $1\frac{1}{2}$ miles to the neighborhood of Twenty-first street and west $2\frac{1}{4}$ miles. The Garfield park line is the continuation of the main line, 4 miles west to the city limits. The Logan Square line runs north 2 miles and then northwest to Logan Square, $4\frac{1}{2}$ miles from the junction at Marshfield avenue. From this line there is a branch line $2\frac{1}{4}$ miles long, paralleling North avenue and called the Humboldt park line. The last two miles of all these branches pass over some territory that is practically unsettled. The balance is thickly populated. At the time the road was projected there was practically no competition in its territory except horse car lines. These surface lines are now being changed to electric, however. The object of the four-track main line is to provide two tracks for express trains, which will make no stops in the 1.8 miles between Marshfield avenue junction and the city. The station platforms on the main line are accessible from all four tracks, so that either pair of tracks can be used for the trains making all stops. The platforms are between the outer and inner pair of tracks. It will be thus seen that the road has facilities for taking care of traffic unequaled by any elevated road in the world.



STATION FRONT.



1. Standard Double Track Structure — 2. Structure over Boulevards — 3. Double Track Station — 4. Rolling Lift Bridges and Towers

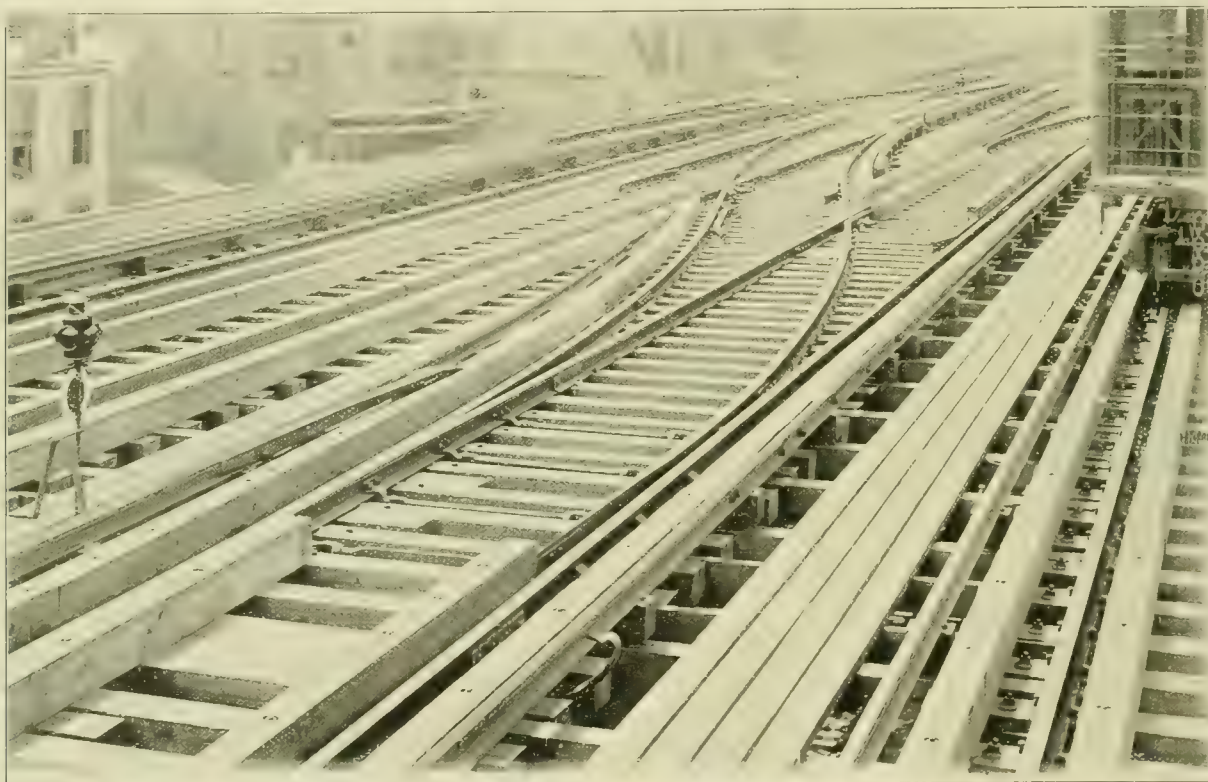
THE ADOPTION OF ELECTRICITY.

In spite of its many features of interest, the road would probably never have attracted the attention it has were it not for the decision to adopt electricity as a motive power. The road was built for a steam road and all the plans were drawn for locomotive traction. The credit for inducing the owners of the road to adopt electricity is probably due more to the present general superintendent, W. E. Baker, than to any other man. As general manager of the Intramural Railway at the World's Fair, he secured possession of facts and figures which were convincing as to the economy of electricity as a motive power. His consultations with the Metropolitan management resulted in the announcement, about a year ago, that

The minimum height of the structure above the street is 14 feet, the usual height being 15 feet. The track is 4 feet 9 inches above the bottom of the supporting girders. The supporting pillars are $14\frac{1}{2}$ to $18\frac{1}{2}$ feet high. The standard foundation is 7 feet deep and 8 feet square. The girders are 4 feet deep. Distance between pillars is 39 to 50 feet. The lateral bracing is equivalent to 450 pounds per lineal foot of track. At boulevard crossings a special ornamental form of structure is employed. The rail is 90-pound T, furnished by the Illinois Steel Company, with 4-bolt fish plates.

VIADUCTS AND BRIDGES.

The most notable of the structures built by this company is the rolling lift or jack knife bridge across the



ON THE STRUCTURE.—THIRD RAIL AND ARRANGEMENT AT SWITCHES.

the road would use electricity. Since then the electrical construction work has been pushed rapidly and the road has been the center of an immense amount of attention. The contract for all the electrical apparatus was let in June, 1894, to the General Electric Company.

Considering the many entirely new problems which had to be faced, the progress made has been something remarkable. The road was first opened for passenger travel May 6. Mr. Baker, who has had charge of the electrical construction work from the beginning, has organized and superintended the electrical work on the road with the most marked executive ability.

STRUCTURE.

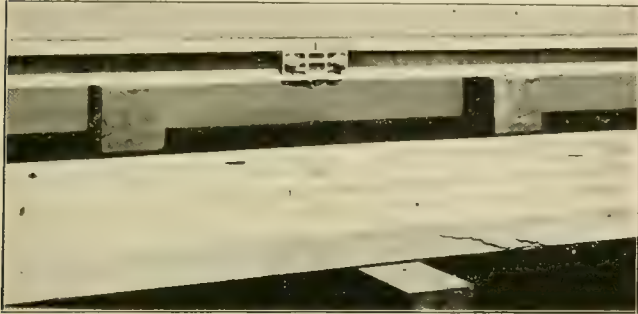
The structure is the heaviest elevated road structure yet built in this country. It was designed to carry safely in service 30-ton locomotives followed by double deck cars.

Chicago river. The bridge spans 174 feet from pier to pier. It is really two distinct bridges, each bridge having two tracks. The two parts are raised and lowered separately. The west halves are operated from an elevated tower between the tracks, and the east halves from the switch and signal tower south of the tracks. The motors, controllers and air brakes for raising and lowering the bridges are practically identical with the motor car equipments described later.

The longest of the viaducts built by this company is that over the tracks of the Chicago & Northwestern Railway near Paulina street. It spans a clear space of 254 feet. At the Union Depot yard a viaduct of two spans, one 227 feet and the other 178 feet, enables the road to get from Canal street to the river. Another notable viaduct is that at Rockwell street, over the tracks of several roads.

ELECTRICAL FEATURES OF THE STRUCTURE.

The greater part of the structure had been built and many of the rails had been laid before the use of electricity was fully decided on. The laying of the third conductor rail was not, however, attended with much

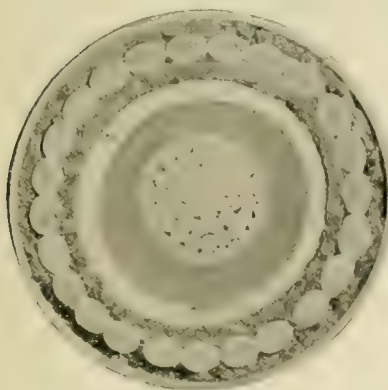


THIRD RAIL, BOND AND SUPPORTS.

difficulty, except at the complicated switches on some parts of the four track structure. The trolley contact rail is 45-pound T, and is run at one side of each track about 7 inches above the track rails. It is supported on blocks of wood which have been boiled in paraffin to fill the pores. These blocks are 6 inches square, and are mounted on iron brackets about 1 inch high. The contact rail is fastened down to these insulating blocks with wood screws and clips. Contact shoes are put on each of the four corners of a motor car, and at switches the third rail on one side is discontinued, and a rail is placed where the shoes on the other side of the car will make contact until the switch is passed. Where the third rail ends at switches, V-shaped frogs, lower at the head than at the point, are provided, so that the trolley shoe will not catch in passing onto a rail. To hold the ends of the trolley rail in alignment, light two-bolt fish plates are used. The bonds are put under the rail base, and consist of heavy flexible copper strips about $\frac{3}{16}$ -inch thick,

and as wide as the base of the rail. These strips have two rivets in each end, which are riveted up through the base of the rail, one each side of the web.

Forty-five pound T rail is also used for feeders. These feed rails are run between tracks and are boxed over for protection and so as



SIMPLEX SUBMARINE CABLE.

not to interfere with workmen walking along the structure. Iron is used, because on a structure of this kind where its support and insulation is easy, it is cheaper than copper feed wire. At switches and at some stations where there is not room on the structure for the feed rails, copper feed wire hung under the structure is substituted. The wire for this purpose and for connecting

feed rails to power station was furnished by Washburn & Moen, the Simplex Electrical Company, and John A. Roebling's Sons Company. The conductor rails are from the Illinois Steel Company.

As in the most advanced street railway practice the contact rail is sectioned, each section being controlled by a feeder panel with circuit breaker at the power house. From the power house, which is only $1\frac{1}{4}$ miles from the down town terminus, 18 feed rails go west. The contact rails are sufficient to feed the down town end. Contact rails are cross bonded and connected to feed rails about every 300 feet, though at switches and curves this distance is lessened. For a return circuit the track rails are not bonded at the joints, but are connected at the middle of each rail to the structure. At all connections where copper wire is connected to iron rails, a cast brass rivet is sweated to the end of the wire and riveted to the rail.

At the Chicago River where the continuity of circuits is broken by the rolling lift bridge, four Simplex rubber



INTERLOCKING SWITCH TOWER AT MARSHFIELD AVENUE.

and lead covered armored submarine cables of 500,000 circular mils and fourteen of 235,000 circular mils capacity were laid on the river bottom. A shallow trench was dredged in the mud of the river bottom before they were laid.

SPECIAL WORK AND INTERLOCKING SYSTEMS.

The four track structure necessitates the use of a much more elaborate system of switches and signals than have yet been put on any elevated road. There are three notable pieces of special work. At Marshfield avenue where three double track lines converge to the four track main line, elaborate special work is put in which allows the sending of trains in any direction. On the viaduct just east of the Canal street station is another complicated piece of special work to facilitate terminal switching. At the east side of the river is still another system of interlocking switches for use at the Franklin street terminus. All the special work for the entire sys-

tem was made by the Paige Iron Works, Chicago, which fact is a striking tribute to the quality of work turned out of those shops. The interlocking switch and signal work was done by the National Switch & Signal Company, of which H. M. Sperry is Chicago agent. One of our engravings shows the tower containing the levers which control the switches and signals at Marshfield avenue. The system of interlocking switches is similar to that used on steam roads but has the added complication of the third contact rail which in some places has to be shifted along with the switches. This problem has never before been faced either by builders of special work or interlocking switches. The tower at Marshfield avenue has 13 levers for 24 switches and 4 movable point frogs; 11 levers for 28 facing point locks; 23 levers for 23 signals; and 6 levers for working 10 contact rails. There are 7 spare spaces for levers, there being a provision for 60 levers on the frame. On the east side of the river the switch tower and bridge operator's tower are combined in a single tower which is shown in one of the engravings.

Electric switch and signal lamps made by the Dressel Railway Lamp Company are to be used. The cases of these lamps are very similar to those of ordinary oil signal lamps. The plan is to run signal lamp circuits five lamps in series with one lamp of the series in the switch tower to indicate whether the circuit is all right. The Dressel Company also furnished the electric headlights and markers mentioned elsewhere.

STATIONS AND PLATFORMS.

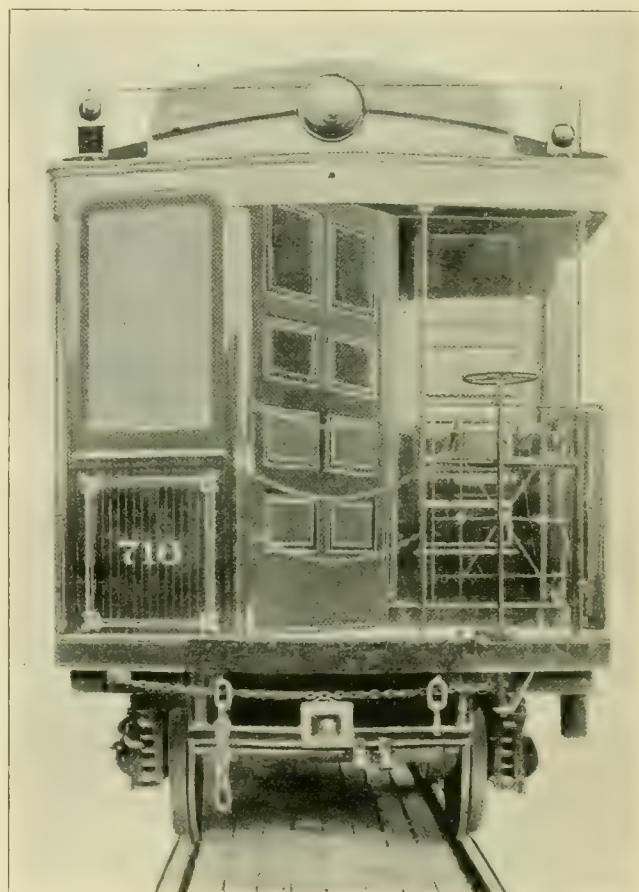
Stations are all built on the ground and on the company's own right of way. They are of rock faced pressed brick, with white limestone trimmings. The arrangement of the station for two and four tracks is very similar. On the two track structure there are two platforms, one on each side of the tracks, and on the four track structure the two platforms are placed between the outer and inner tracks. Entering the right hand door at the street level the passenger must pass in front of the cashier's window, where he pays a cash fare which is rung up on a Meaker fare register. This is something entirely new in elevated road practice, and the experiment will no doubt be watched with interest. Proceeding straight ahead, the passenger goes up a broad stairway for half a flight. Here is a roomy landing from which stairways lead by easy stages to the two platforms. Only one man is employed at the majority of the stations. If desired, the number of men and registers can be increased to take care of heavy travel. On the four track structure where the platforms are between the inner and outer tracks, the outer tracks curve out to allow room for the platforms.

ROLLING STOCK.

The road has at present an equipment of 55 motor cars and 100 trailers. For the first few years trains of one motor and two trailers will be run. The present motor cars have two motors. When the traffic increases

enough to justify longer trains, two more motors will be put on each motor car and six car trains can be run.

The motor cars were turned out of the factory of the Barney & Smith Car Company, Dayton, Ohio. They are 47 feet 2 $\frac{3}{4}$ -inches over all, and 40 feet over the sills. The width at the sills is 8 feet 7 inches, and at the eaves 8 feet 11 inches. The roof is 12 feet 10 inches from the rail. These motor cars are intended as smokers, and have none but side seats. The motorman's cab occupies two corners, half of each cab being in the car and the other half occupying half of the platform. The entrance



END OF MOTOR CAR, HEADLIGHT AND MARKERS.

to the cab is through a swinging door. The sliding door of the car slides back into the cab. To give the car strength to act as an electric locomotive a very substantial steel sub frame was put on, and in order to have sufficient traction, no attempt was made to lighten anything about the motor cars. The weight of the car, exclusive of the motor is about 40,000 pounds. They are finished in quartered oak and have rattan covered side seats.

The motor car trucks were built by the Baldwin Locomotive Works. They consist of very heavy steel frames with central cross beams hung on elliptic springs, as shown in the engravings. One end of each of the motors is suspended from the center beam.

The 100 trail cars were turned out of the Pullman shops, and are finished in selected mahogany. The ceilings are elaborately decorated to harmonize with the

interior finish. The dimensions of these cars correspond approximately with those of the motor cars. They are 47 feet, 3 inches over all, with bodies 40 feet. There are twelve windows on each side, and the seating capacity is 48. The Bushnell spring seats are covered with rattan.

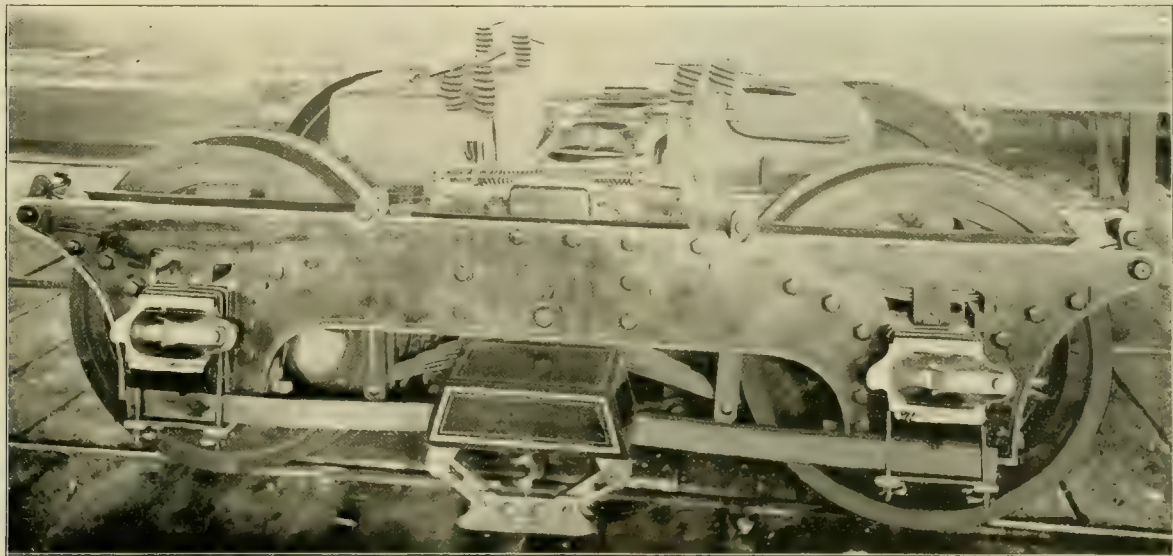
All the cars on this road are painted the standard Pullman sleeping car color. The coaches, both motor and trailer, are the most handsome ever put in elevated railway service.

This is the first elevated road to adopt an automatic coupler, the Van Dorn coupler being selected because the management believed that an automatic coupler is a life saver, and that a life saver is a good investment for any road. This is the only automatic coupler on the market suited to elevated service where the curves are sharp. It is interesting to note that the cars were delivered to the Metropolitan by the steam road in trains

trail cars and are to be connected to the motor car by a separate hose. This arrangement is simply for air storage and is entirely independent of the train pipe supplying air to the brake cylinders.

ELECTRICAL EQUIPMENT OF CARS.

The electrical arrangements in the motorman's cab are very complete. In the right hand front corner is the air brake valve. Just left of this is the series-parallel controller. On the wall of the cab at the left of the motorman is a circuit breaker. This is the standard station circuit breaker of the General Electric Company and is exactly similar to those put on the panels of station switchboards. A fuse is also placed in the cab, but it is very heavy, and it is not intended that it shall melt except in extreme cases. The circuit breaker is intended to take care of all ordinary overloads. In one cab is the air pump operated by an electric motor. This motor is



MOTOR TRUCK.

of twenty-five, without the slightest injury to the couplers.

For brake equipment the New York Air Brake Company's straight air brake was selected. The reason for the selection of the straight air brake was that the motorman has a much more accurate control of his train in making stops with a straight air brake than with an "automatic" brake in which the motorman has not direct control of the valve supplying the brake cylinders. The straight air brake is also much simpler and hence more easily understood. Hence, better results can be got from it by the average run of men. It has the disadvantage, of course, that if the train pipe parts the brakes are useless, but in such an event the motors can be reversed and put in parallel with the circuit breaker open. This would stop the train in case of an emergency. For six car trains it is hardly practicable to carry an air storage cylinder large enough to brake a train making frequent stops, although with the present three car trains the motor car storage is ample. To provide for the future, storage tanks have been put on all the

automatically cut in and out of action by the air pressure in the main reservoir. This automatic regulator is put on the left wall of the cab, below the circuit breaker. The cab which does not have the air pump in has a small rheostat controller for the air pump motor. In front of the motorman is an air pressure gage with two different colored pointers. One pointer indicates the pressure in the main reservoir and the other the pressure in the train pipe and brake cylinders. To avoid any annoyance from having circuit breakers on both ends of a car, they are connected in parallel and the motorman throws out the one at the rear when he leaves it to change ends.

The series-parallel controller is an imposing structure compared to the General Electric Company's type "K" used on street cars. Providing as it does for four motors and such heavy current, it necessarily has to be larger and more complicated. The arrangement is such that it can be used as a series-parallel controller or as a plain multiple controller. The reason for this is that sometimes when starting with a heavy load with the motors



INTERIOR CAB.

in series, one pair of wheels will slip and the counter electro-motive force of the slipping motor reduces the current flowing through the others, so that the power of starting is still further reduced. With the motors in multiple the slipping of one does not affect the other. The arrangement of the controller is very peculiar. When the controller is off, the handle is always at the left, and when it is at the left the controller is always off. To make a start with the motors in series the motorman turns the handle in a direction contrary to the hands of a watch. When he has gone a half a revolution the motors are in series with all the resistance out. To put the motors in multiple he continues turning a full revolution. During the revolution and a half necessary to make the



CONTACT SHOE, UNCOVERED.

ordinary start the steps have been as follows: During the first half revolution the motors are in series and the resistance is gradually cut out. During the second half revolution the process is reversed, so that at the end of the first revolution the motors are entirely cut out as they were before starting. When, however, the handle begins on the second revolution, the motors are in multiple with the resistance all in circuit. When a revolution and

a half has been covered the motors are in multiple with no resistance in. To shut off current and bring controller back to zero, the motorman continues another half revolution. To start with the motors in multiple the handle is turned a half revolution in the direction of the hands of a watch. Indicators on top of the controller plainly show the motorman what he is doing. In ordinary service a man need only turn the handle one way, a revolution and a half to start and a half revolution more to shut off current. The magnetic blow out is of course used on this controller. In the cab near the brake valve is a small handle for turning on the sand. The sand will be blown by compressed air.

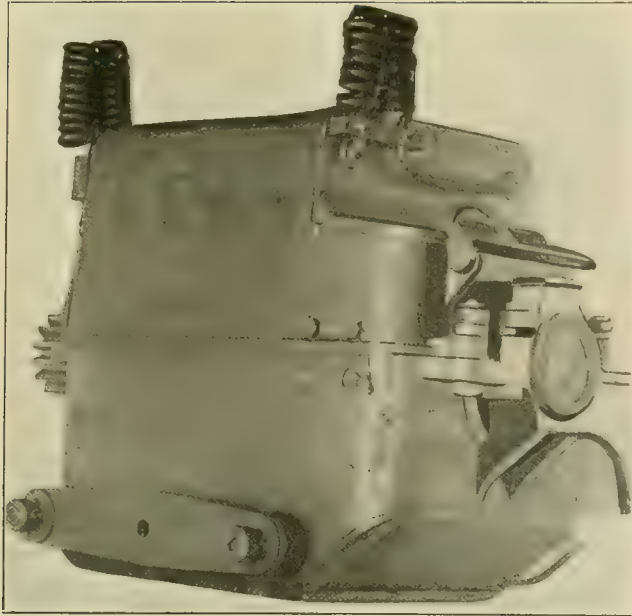


TRAILER PLUG.

The motors are somewhat similar to the General Electric 800, except they are of course much heavier, weighing about 4,000 pounds each. The armatures are barrel wound, and the insulation of the motors is asbestos, so that they are believed to be fireproof. Doors are provided both above and below the commutator, and the brush holders can be put either above or below so that they can be looked after from the car or from the pit. Another feature peculiar to this motor is that there is a cap to slip over the end of the brush so that a side contact is not depended upon. The suspension of the motor is by a link from the center cross beam of the truck. The only spring in the suspension is that afforded by the springs in the truck. The connection between



INTERIOR TRAILER.



MOTOR.—SUSPENSION LINK ATTACHES TO MIDDLE OF BAR ON SIDE.

motor leads and car wiring is made with a new form of connector, which gives as good and permanent a connection as a soldered joint, and yet is quicker than the usual unsatisfactory and unreliable binding screw connectors. The connector is in two pieces, one on the motor, the other on the car wire. They are put together at right angles, and a quarter turn fastens them securely.

All cars are heated with electric heaters, made by the Central Electric Heating Company, of New York. In all, there are twelve heaters to each car. They are arranged in series of four. When all are in circuit, the current taken is 14 amperes at 500 volts. The motorman's cab also has a small heater. The selection of electric heaters for heating on such a large scale was a surprise to many, but it only demonstrated the policy of the Metropolitan road to get the best of everything and cater to the public comfort.

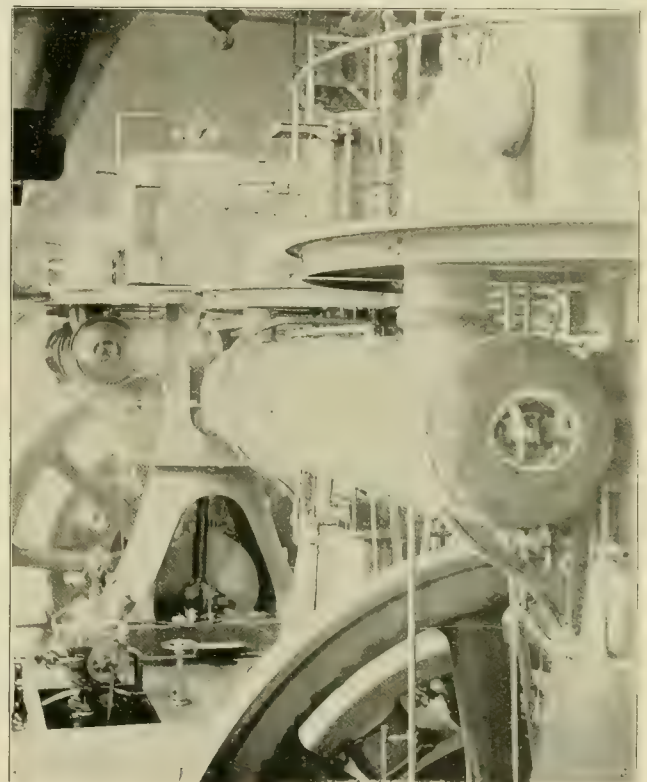
Every motor car has electric headlights and "markers," or designation lights. The electric headlight is put over the center of the hood, and the two markers are put on each side of it. The markers are necessary to indicate the destination of the train, as there are to be four routes



POWER HOUSE AND COAL SIDING FROM THE STRUCTURE.

and both express and local service. The markers are three sided lanterns giving three colors, so that with the two markers, nine combinations can be made. The headlight markers and lights in motorman's cab, a series of five at each end of a motor car are on an independent circuit, which is turned on and off as the motorman changes ends. The lighting and heater switches are concealed in a panel.

The contact shoes of which there are four to each motor car, are most remarkable mechanisms. They are supported on wood beams projecting out from the motor truck frames. There is absolutely nothing more to the mechanism than is apparent from the engravings. There is a chilled cast iron shoe hanging loosely by links slotted at one end. There are no springs about it. A flexible copper wire connects to the middle of the shoe to



THE TWO 2,000-HORSE-POWER UNITS.

make electrical connection. The first impression of one examining this shoe is that it is absolutely worthless, as it apparently hangs limp and loose. However, the angles of the links by which it is hung are such that it is perfectly rigid in the direction in which the ordinary strain comes, while it will give way to unusual obstructions. This little device affords an interesting lesson in mechanics.

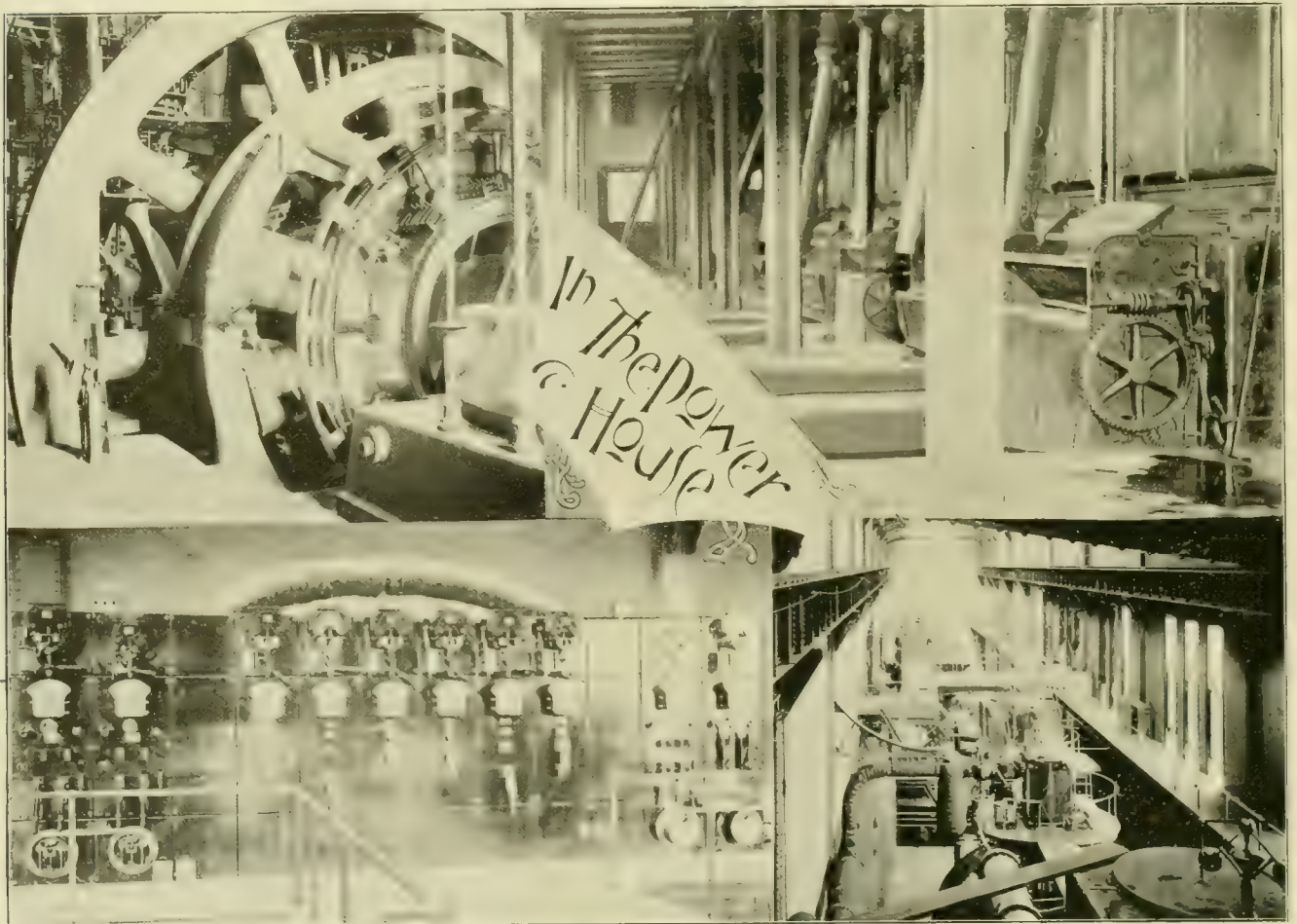
The sockets for trailer plug connections are put under the corners of the platforms. The sockets are double, and when a plug is not in use its two ends can be inserted to avoid danger of grounds.

POWER PLANT.

The power plant is not essentially different from other large modern electric railway power plants. Very few,

however, have such a large capacity in a given space. At present it is of about 6,000-horse-power nominal capacity. It is 300 feet long and only 90 feet wide, two tracks of the elevated structure passing on each side of it, and a coal siding running directly over the boiler room as explained later. It is about midway between Throop and Loomis streets, $1\frac{1}{4}$ miles from the Franklin street terminus, and can be extended east and west to occupy nearly the length of the block between those streets. In this way it could be increased to 12,000-horse-power. The distance to the river is about one mile, and provision

Each cylinder is fitted with a special Reynolds corliss valve gear, which allows cutting off steam at any point from zero to $\frac{3}{4}$ stroke. The cut-off of both cylinders is controlled by a heavy fly ball governor. The valve gear is also so arranged that if desired the low pressure cut-off may be set by hand instead of being controlled by the governor. Each engine is provided with a separate governor which controls a butterfly valve in the main steam pipe. This governor is set so that if anything should happen to the governor which controls the speed of the engine, causing it to run away, the auxiliary



has been made for running the station condensing. The company owns the right of way to the river and a tunnel for condensing water could be built with cut and cover work, and hence would not be very expensive. There are four Reynolds-Corliss vertical cross compound condensing engines built by the E. P. Allis Company, of Milwaukee. The two large engines are direct connected to General Electric 1,500-kilowatt generators and are guaranteed to work satisfactorily with a load of 3,100-horse-power. The two small engines are direct connected to 800-kilowatt generators and are guaranteed to a load of 1,500-horse-power. The engines are the new pattern vertical machine recently designed by Edwin Reynolds, superintendent of the E. P. Allis Company.

governor would close the butterfly valve and shut off steam entirely from the engine before the speed could increase to a dangerous point. The connecting rods for the two sides of the engine are connected to overhung cranks on the ends of the shaft, and the fly wheel and armature are keyed onto the shaft between the two main frames of the engine. The engines are very heavy and massive and are spread out wide in all directions on top of the foundations so as to prevent vibration. The principal dimensions of the two large engines are as follows: Stroke, 48 inches; diameter high pressure cylinder, 36 inches; low pressure cylinder, 72 inches; diameter main shaft, 24 inches; length, 22 feet; fly wheel, 24 feet 4 inches in diameter; weight, 150,000; revolu-

tions per minute, 75. With each of these large engines is a Reynolds independent vertical air pump and condenser with air pump 36 inches in diameter by 16 inch stroke, driven by a corliss steam cylinder 16 inches in diameter. The two small engines are of exactly similar proportions as the large. The initial steam pressure is 125 pounds. Each engine has a Stratton separator.

The generators are similar to those already put in other power plants by the General Electric Company, and are therefore familiar to most of our readers.

A traveling crane, put in by the Morgan Engineering Company, runs the length of the engine room. This is operated entirely by electricity. In the middle of the engine room is the engineers' toilet and store room, and on the gallery above it is the engineer's office. A gallery opposite the office gives access to the steam headers. The switchboard is on a gallery at about the level of the elevated structure. From the switchboard the feeders run under the gallery floor directly to the structure. Recording wattmeters are put in each generator circuit. This is the most extensive use yet made of the recording wattmeter in power station practice.

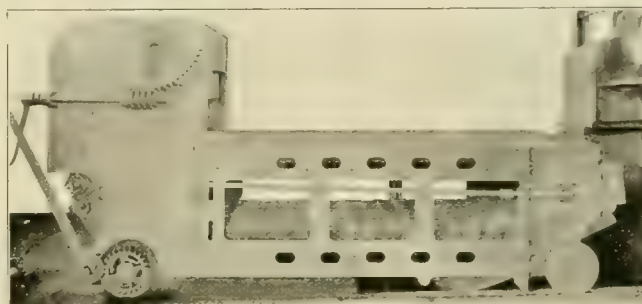
The boiler room contains twelve 300-horse-power Babcock & Wilcox boilers, in batteries of two each. The most interesting thing about this boiler room is the arrangement for handling and burning coal. Coal is thrown directly into storage bins in front of the boilers



POWER HOUSE FROM WEST.

by being dumped down through doors in the roof from cars on a siding of the elevated structure which passes directly overhead, or it can be hauled by teams to the alley in front of the boiler room and thrown in through the windows. Coal can be run onto the structure at West Forty-eight street, the terminus of the Garfield park line, where connection is made with the Chicago & Western Indiana, known as the Belt line. It is a leading coal road, and hence there is a good chance for a cheap supply. Chutes take the coal from the bins to the hoppers of the mechanical stokers. These mechanical stokers were installed by Babcock & Wilcox, along with the boilers, and possess a number of excellent features

not possessed by other stokers. The grate of this stoker consists simply of an endless chain running over sprockets at the front and rear. The coal from the hopper feeds onto this chain and motion is supplied the chain by a stoker engine furnishing this power for several batteries of boilers. If the right speed is given to the grate, the



BABCOCK & WILCOX MECHANICAL STOKER.

fresh coal will take fire before it has traveled many inches of the grate, and will be practically consumed by the time it reaches the back of the grate. The motion of the grate over the sprockets at the back throws the ashes down into the pit. The speed of each grate is regulated independently of the main driving shaft by changing the length of the crank working the ratchet which drives the grate. This stoker has the advantage over others that it gives a perfectly even and level grate surface and the grate does not move relative to the coal. This allows the burning of fine cheap fuel, and insures an evenly distributed admission of air to the fire. Another advantage of this stoker is the fact that at a moment's notice the whole thing can be pulled out from under the boiler, as it is mounted on wheels and runs on a track. Its appearance when pulled from under a boiler is shown in one of the accompanying engravings. The boiler room has a basement in which the ashes fall and are taken care of. Cheap slack is used for fuel.

A steel stack 150 feet high and 12 1/2 feet inside diameter lined with brick furnishes the draft. This can be supplemented by two Sturtevant blowers which can deliver air to the ash pits. The only entrance to the engine room from the boiler room is through a small passage in the base of the stack.

SHOPS.

The shops are between Throop street and Center avenue. They are two stories high, the second floor being level with the structure. Cars are run in on the second floor and here all the work on the car bodies and the light repairing is done. When heavy work is to be done on trucks or motors the truck is taken down to the ground floor on a hydraulic lift. On this floor is a machine shop well equipped for doing the necessary work.

The present officers are Robert E. Jenkins, president; George R. Higginson, Jr., secretary, and W. E. Baker, general superintendent. Besides these should be mentioned M. H. Gerry, superintendent of motive power, who

has taken a very active part in the electrical construction and H. N. Brinckerhoff, electrical engineer. E. W. Eckert was chief engineer of the mechanical construction.

W. E. Baker, general superintendent, began electrical work at the head of the electrical department of the West End Street Railway of Boston at the time the change



W. E. BAKER.

was being made to electricity. Previous to this he was engaged in steam road building in Texas, where he built many hundred miles. The West End road being the first large system to adopt electricity. Mr. Baker had ample opportunity to demonstrate his ability as a manager during the trying period. After leaving the West End road he was connected for a time with the General Elec-

tric Company and when the Intramural road was built at the World's Fair he was made general manager and had full charge of construction and operation. No small part of the success of this road was due to his guidance. The road demonstrated beyond question the economy of electricity as a motive power and, as said before, to Mr. Baker more than to any other man is due the credit for the electrical equipment of America's first great electric elevated road. In the year that has elapsed since the beginning of the preparations for electric traction on this road Mr. Baker has successfully handled the thousands of details which would have overwhelmed a man of less executive ability and the success with which the road is being started is a daily testimonial to his work.

THE STUART STEAM SEPARATOR.

Dry steam in the engine cylinder means economy at

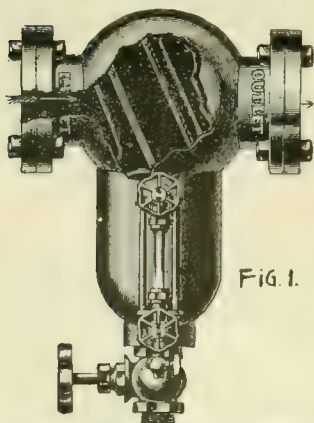


FIG. 1.

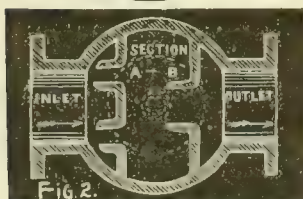


FIG. 2.

the coal pile. Hence, the increasing use of separators in steam power plants. But it too often happens that a separator which takes out the entrained water satisfactorily, does so at the expense of a reduction of several pounds in the steam pressure, owing to the poorly contrived baffle-plates. Such a separator had better be thrown away, as being worse than none. The Stuart separator is not one of these. It is said to free the steam from all entrained water and solid matter. Its simplicity is apparent, by reference to the ac-

companying engravings. This separator is furnished by

Hoadley Bros., Old Colony building, Chicago, who are well known steam engineers. They have just purchased the American system of steam distribution, patented by F. Sargent, formerly engineer of the World's Fair. Many large power plants have been equipped on this system, among them are those of the Chicago City Railway, Metropolitan Elevated, Garden City Railway Plant, Chicago Edison Company, New Stock Exchange building, new Chicago Library, North Chicago Electric Railway, West Chicago Street Railroad, and the Cicero & Proviso Street Railway.

W. J. RICHARDSON, DEAD.

With a sincere feeling of sadness and personal loss, and no less of surprise, will the fraternity learn of the



THE LATE W. J. RICHARDSON.

death of William J. Richardson, Brooklyn, all his business life connected with the Atlantic Avenue road of that city, and secretary, since its inception, of the American Street Railway Association. While it was known he was not in the best of health for several months, it was not generally known how serious his condition was. Mental troubles, dating from the last strike, culminated in nerve disorder, finally taking the form of spinal-meningitis. A week previous to his death, at the advice of his physicians, he was removed to the Presbyterian hospital and underwent an operation there, Friday morning, April 26th, from which he never rallied.

William James Richardson was born in Albany, October 22, 1849. His early education was secured at the state normal school. In 1876 he began assisting his father, the late William Richardson, in his railway business in Brooklyn, where he remained two years. Then followed three years in the collegiate department of the Brooklyn Polytechnic & Collegiate Institute. After graduating, he became superintendent of the Brooklyn, Carnarsie & Rockaway Beach Railroad and steamboat line, remaining for one year, when he resigned to join

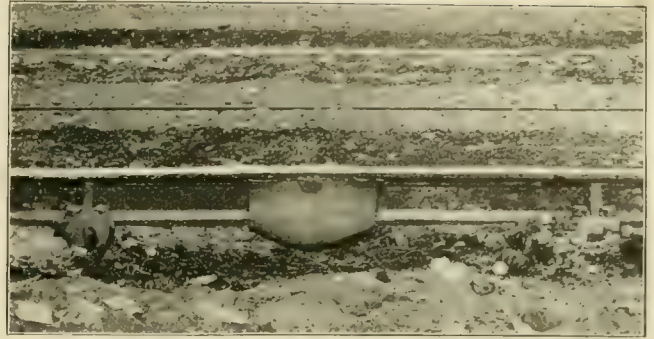
his father in the operation of the Atlantic Avenue lines, then known as Atlantic Avenue, East New York & Greenwood Railroad. When the company was reorganized Mr. Richardson was elected secretary and latterly was a member of the board of directors.

In 1873, Mr. Richardson married Miss Mary C. Raymond, daughter of J. H. Raymond, L.L. D., president of Vassar College. Mrs. Richardson is a most estimable woman, who has endeared herself to all the members of the American Street Railway Association.

Mr. Richardson has also held continuously since its organization the office of secretary and treasurer of the New York State Railway Association which he served with equal faithfulness. He was a man of high ideals, active in church work, and president of the Employes' Benevolent Association of the Atlantic Avenue road. He will be greatly missed and in their bereavement his family has the deep sympathy of the railway fraternity.

CASTING RAIL JOINTS IN CHICAGO.

The Falk Manufacturing Company, of Milwaukee, has been very actively engaged in Chicago this spring, applying its process of cast welding joints to track that is



CAST WELDED JOINT, 1895 PATTERN.

work on the cable lines has to be carried on at night, during the hours the road is shut down.

STRIEBY & FOOTE RAIL BOND.

A new rail bond of very substantial construction has been brought out by Strieby & Foote, Newark, N. J., extensive dealers in the supplies necessary to the equipment of electric railways. The bond proper consists of a massive copper rod with rings on the ends. These rings are of such size as to give a contact many times the cross section of the bond. They are bolted to the



CUPOLA AND SUPPLY TRUCK FOR CAST WELDING JOINTS, 1895 PATTERN.

being relaid by the Chicago City Railway. The greater part of the cable track relaid this spring has this joint, and some electric track has been cast welded. Eleven miles of single track has been done already and many more miles will probably be completed before fall. Half of the electric track on Wentworth avenue has the cast joints and the other half will soon be supplied. This is one of the most important electric lines on the system. It is a 7-inch girder rail, and the joints cast on it weigh 121 pounds. On the Cottage Grove cable the joint is 81-pounds on 4½-inch girder rail. The form of the joint has been changed from last year to give more metal near the rail ends, where it is needed. Probably all of the City Railway cable lines will be relaid this year and the cast joint employed. The Falk Company has also begun to cast joints for the West Chicago Street Railroad. The

rail web with the bolts sweated into the rings as shown in the engraving. The bond does not pretend to be a cheap bond, but is among the better, higher class bonds,

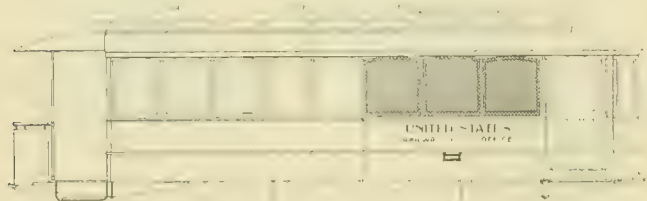


and is a very efficient type. The line of goods carried by this well known firm is greatly strengthened by the addition of such an excellent appliance.

F. R. Owen, of Philadelphia, has been appointed electrical engineer of the Schuylkill Electric Railway, Pottsville, Pa.

STANDARD MAIL CAR.

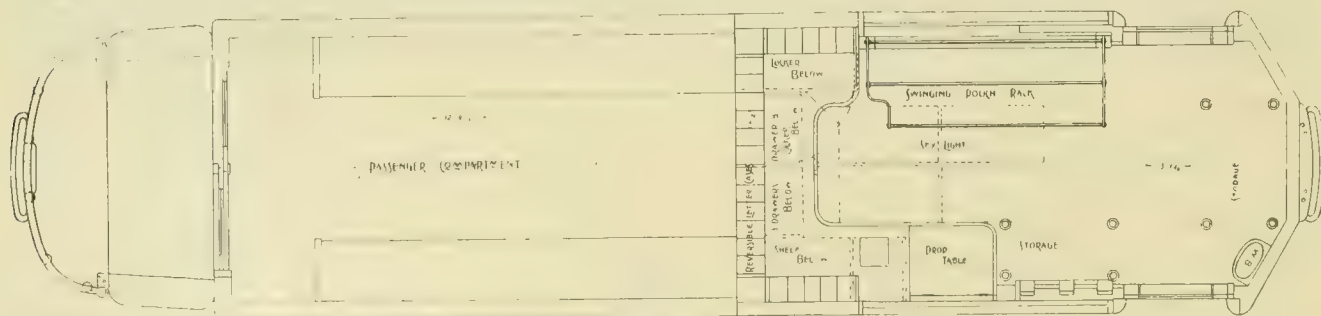
There is building for the West Chicago Street Railroad Company a postal car that has been adopted by the United States as standard. A sketch and plan are shown herewith which describe themselves. The car is 30 feet long, two feet longer than the Brooklyn car, with one platform 4 feet 6 inches. There are two divisions, one for passengers and the other for the mail service. The mail compartment is supplied with boxes for letters and papers and mail bag racks the same as mail cars on steam roads, except on a smaller scale, for the distribution and



STANDARD MAIL CAR FOR STREET RAILWAYS

handling of mail by the messengers. There is also a wash stand and water coolers. The mail compartment is well lighted with large windows in the sides of the car and by a skylight arranged in the upper deck. Wire screens to all windows will prevent mail matter from being lost. The interior is finished in selected quarter-sawed oak and a decorated quarter-sawed oak ceiling. The trimmings are solid bronze, highly polished, and the windows are furnished with roller curtains. The exterior is painted in "postal white" and lettered in gold leaf. The Pullman Company built the car.

The postal service is being adopted generally in most cities where there is a free delivery. This is a beneficial movement on the part of the authorities, as it secures a quicker service in the delivery of mails, and should be encouraged. Collections will be made at various points, and the letters delivered to their proper stations where possible, without being taken to the main office.



PLAN STANDARD STREET RAILWAY MAIL CAR.

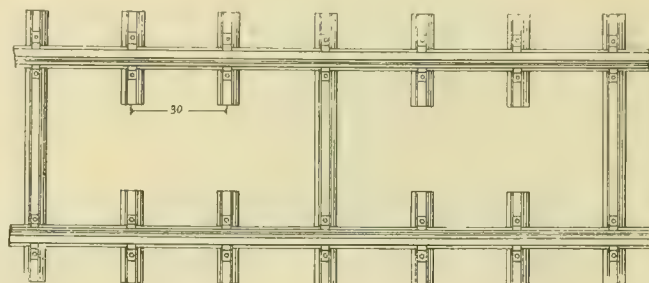
Six cars were started May 1 on the suburban lines of the West End Street Railway Company, Boston, which did such good service that it was found better time could be made than was provided for by schedule. The style of cars is the same as the standard car described, except that it is a motor car and has two five-light circuits. No difficulty was experienced with teams obstructing the tracks, although no special signal distinguished the mail

car from an ordinary motor. So successful was the experiment that it exceeded expectations, the clerks on some lines being able to sort the mail for the carriers, delivering it to them ready for immediate distribution, thereby saving considerable time.

The Schuylkill Electric Traction Company carries mail from Pottsville, Pa., to Minersville. Heretofore two mails a day were carried by horse and wagons, an hour being required to make the trip with frequent delays. Now the electric railway carries three mails every day.

NEW ARRANGEMENT OF DANIELS STEEL TIE.

The Daniels Steel Railroad Tie Company, of Youngstown, O., has a plan for using its tie which makes it a still more serious competitor of the wood tie as to price. The plan is shown in the accompanying diagram. The



NEW ARRANGEMENT OF DANIELS STEEL TIE.

idea is to place two short ties to every long one. They are put 30 inches between centers, and the short ones are 21 inches long. Four short ties are made of one long one. With an absolutely firm and rigid metallic tie, it is claimed that every long third tie gives enough strength to prevent canting outward while the center of a tie is not tamped under in railroad practice, and hence has no function in supporting the track. With this

arrangement the cost of ties is brought down equal to that of wood ties at 45 cents each. The Daniels steel tie has been giving perfect satisfaction where laid.

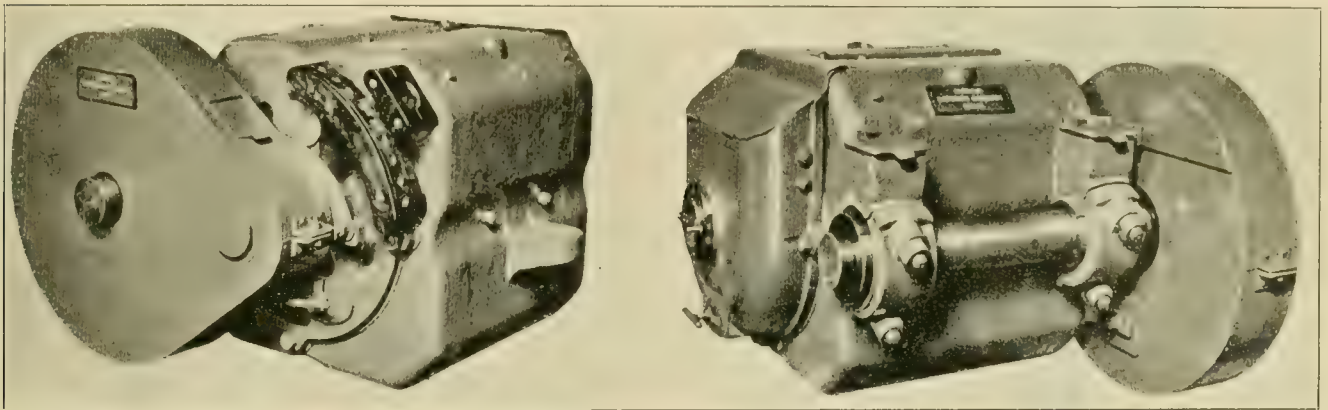
The Commercial Electric Company of Indianapolis has issued a new catalog of its dynamos for railway and lighting purposes, both for belt drive and direct connection.

STREET RAILWAY MOTORS OF THE ALLEMEINE ELEKTRICITATS GESELLSCHAFT.

The street railway motors made by the Allemeine Elektricitats Gesellschaft of Berlin, Germany, are interesting because they are in one respect radically different from the modern American type which has been adopted by other prominent European electrical companies. The 25-horse-power motor of this company is shown in the accompanying engraving. It is an enclosed motor but the field magnet frame is not divided into upper and lower halves as is the case with all American motors. Apparently the only way to get the armature out is at the end. This would not be thought a desirable arrange-

likely many times to prove dangerous. We have tested air brakes, and a year or more ago spent \$12,000 in equipping some of our cars with them, but we were forced to take them off. We are experimenting further in this direction.

"On all the cars running on our Seventh avenue line we have had in use for some time the fenders which are in vogue on the Broadway cable cars, New York City, and as these are attached to the truck instead of the car body, they ought to prove effective, but probably they will not in every case. On our other lines we are adopting four different styles of fenders, but I cannot say that they will be absolutely effective in all cases. We would be very glad, indeed, to have a commission of experts select a suitable fender, because we have



RADICALLY DIFFERENT FROM AMERICAN MOTORS.

ment in an American car barn or repair shop because of the great amount of labor necessary to take out an armature or properly inspect a motor. By having the magnetic circuit of the motor in one solid piece as in this case it is perhaps slightly stronger and more compact for a given weight than if it was divided into upper and lower halves.

BENJAMIN NORTON ON FENDERS.

President Benjamin Norton, in speaking of the fender question, said that the Atlantic Avenue Railroad Company of Brooklyn, had tried sixty different kinds and knew of no good one. He added: "To my way of thinking, after all the experiments we have tried, the most successful fender is a rigid set of rules and regulations, which all motormen should be required to live up to, and especially to run cars at a moderate rate of speed. Most of the regulations just put in effect by city ordinance with reference to the operation of electric cars have been in vogue with the Atlantic Avenue Railroad Company for upwards of two years. The regulation, however, which requires cars to come to a stop at the near crossing is bad in many ways, because in wet and snowy weather it compels passengers to alight in the street instead of on the crosswalk, unless the gates on the front platform are kept open. When this is done it is an invitation for passengers to jump on the car when it is in motion, and is

exhausted all our efforts in this direction and have not yet succeeded. Even the Railroad Commissioners declare that they are not yet in position to recommend one. I quite approve of the reduced speed regulation and all the features of the new city ordinance except the one which requires the cars to stop on the near crossing."

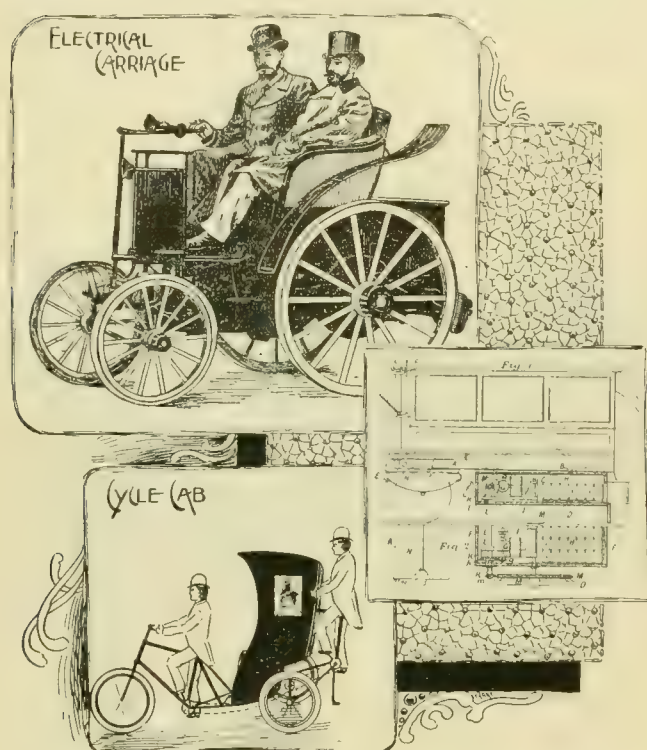
About a dozen different kinds of fenders are being placed on the Fulton street cars of the Brooklyn Heights Company.

POLE RUSTING IN SAN FRANCISCO.

Look out for the rusting of your iron poles near the surface of the ground. At San Francisco, E. P. Vining, general manager of the Market Street Railway consolidated system has been obliged to break away all the ornamental bases used at the bottoms of poles to stop the rusting which was taking place rapidly underneath these bases. The reason seems to be that rain water collects under the base and does not dry quickly, hence corrosion takes place. San Francisco being a seaboard city, there is of course more tendency for iron to rust than in the interior. This is a matter that it is well for all roads to look out for. The North and West Chicago Street Railroads on their construction work have taken the precaution to put all iron poles inside of sleeves which come a little above the surface of the ground. The efficacy of this arrangement remains to be seen.

RUN BY ELECTRICITY.

It is believed in some circles that there would be a demand for electrically propelled vehicles from a large number of persons who would like to own carriages, if it were not for the trouble and expense of keeping horses, and are too lazy or in other ways incapacitated for riding bicycles. To satisfy this long felt want a numerous class of inventors have been bending their energies. Figs. 1



and 2 represent an English invention "intended to facilitate the application of electric propelling mechanism to existing four wheeled draught vehicles, by using without alteration the body, and also parts of the under-carriage." The motors G, and accumulators H are attached to the rear axle C. The motors are geared to the driving wheels D, and the body rests on the frame. A hand-wheel P at the driver's seat is connected with the motors so as to control the current.

The electric carriage is a French invention, which is designed for a cab line in the French metropolis. It weighs about 2,645 pounds. The inventor uses Fulmen accumulators, with a current of 100 amperes and 100 volts pressure. The hands are used for steering and the feet for controlling the switch and brake. A circuit breaker is placed on the brake pedal, so that the current is disconnected when the brake is applied. The speed is said to be about 12½ miles an hour.

The inventor of the cycle cab thought it was a waste of time to work on an expensive substitute for horses, so adapted the bicycle principle to the ordinary hansom cab. It is an English invention. The driver in front works the pedals and steers, while the footman behind assists him by pushing it along, whether it is a good thing or not.

ONE ROAD'S ACCIDENT RECORD.

The Tama, Iowa, Herald gives the accident record of the nine months' operation of the smallest interurban road in the world, in the following: "Since the electric street car has been in operation the cars have killed four chickens and cut off a dog's tail. We understand Mr. Ong is working on an invention, something in the line of a separator. It will be placed under the rear end of the car, and if it operates as successfully as Mr. Ong hopes, will gather in all the spring chickens and reject tough old roosters and dogs' tails. Mr. Ong has a fertile brain and his novel idea is deserving of success."

NOVEL METHOD OF TRANSPORTING A CABLE.

Every manager of cable roads has had his ingenuity frequently taxed in removing the immense spools weighing 40 to 60 tons each, from depot to power house. The Age of Steel relates the observations of an American traveling recently in Mexico, where the burro as a factor in the transportation problem claimed a share of his attention while away; and in connection with that docile and sure footed animal, he tells a good story illustrating Mexican ingenuity in its most highly developed form. It seems that Boss Shepherd—he of Washington fame—has a very rich mine in an almost inaccessible part of the Mexican mountain ranges, a long way removed from any railroad, which he has been equipping at great cost with first-class mechanical appliances. Sometime ago Mr. Shepherd concluded that his equipment required 5,000 or 6,000 feet of wire rope for carrier purposes, but how to get it up into his mountain fastness in a single piece, as required, was a question. By no possibility could it be moved from the railroad to final destination on wheels, and he didn't see how it could be carried by burros. But a Mexican did. He explained his plan, got the contract for carrying the 1¼-inch cable, and successfully executed it. Here is the way he did it. He coiled the rope up at fixed distances along its entire length, each coil being of approximately the same size and designed



BETTER THAN A TRUCK.

to weigh 300 pounds, and loaded it on a string of burros with proper fastenings. To take up the slack between each two burros, two Mexicans with padded shoulders were inserted and faithfully kept up their end, or rather portion of the line. The procession was a curious one, to be sure, but it got there just the same.

STREET RAILWAY SUMMER RESORTS.

More street railway companies will make money out of parks and summer resorts this season than ever. Many new resorts have been opened, while those companies which have maintained such institutions have demonstrated that they improve with age, and that each succeeding season shows more profit than its predecessor. The REVIEW is very much gratified by the success of these institutions, for it was the first publication to advocate them. They have been successful beyond our fondest anticipations, so much so, that the manipulation of summer resorts is beginning to be scientific, still the science is only in its infancy. Each year will see development, which will make the old timers smile as they look back and make comparisons with the resorts of to-day, which admirably answer the purposes for which they were designed.

While a summer resort with its green grass, shade trees, flowers and well laid out walks and drives is an attraction in itself, its money making ability can be increased by the addition of some amusement, or musical feature. Even with every road for itself, the expense of the minor attractions is not large, but under the plan, as outlined in the REVIEW, a few issues ago, of the circuit organized by the Minneapolis, Kansas City and other roads, the expense will be considerably lessened, at the same time enabling managers to procure a better class of entertainment. Next year the circuit plan will be much improved and extended, so as to take in more roads. No admission is charged for these entertainments, which are the same that play in first-class theatres in the winter.

In addition to passenger fares, a source of revenue is the leasing of privileges, which should be done on a percentage basis, in order to obtain the largest returns. There is the restaurant privilege, candy, popcorn, peanut, cigars, fruit, soft drinks, ice cream, boating, photograph gallery, merry go round, stereopticon views, phonograph, kinoscope and many other privileges that pull money out of the pockets of visitors.

The grass has been cut, the trees trimmed, pathways graded, flowers planted, and other work done to present an attractive place in many street railway parks. All of them are beginning to draw the people, especially on Sundays. In order to show something of the extent of these institutions the REVIEW prints below a list by no means complete, of some of them. It is our intention to illustrate resorts from time to time, and we are always willing to receive photographs and descriptions from street railway managers who would like to have their resorts illustrated.

The Davenport & Rock Island Street Railway Company has leased the Black Hawk Inn at the Watch Tower, to Krell & Math. Arrangements have been made for high class theatrical attractions beginning May 15 with matinees Wednesday, Saturday and Sunday. This company is in the street railway circuit.

The Dartmouth & Westport Street Railway Company, Fall River, Mass., has arranged a large number of

attractions for Lincoln park. A theatre has been built, so that the dance hall can be used exclusively for dancing. A Punch and Judy show has been engaged for the season. The park will be opened May 30th by a company of jubilee singers. The first two weeks in June will be occupied by a colored troupe in plantation scenes. The Knights of Pythias have secured the grounds for an outing and the Massachusetts Street Railway Association will hold its annual outing at Lincoln park.

April 7th the Duluth Street Railway Company, Duluth, Minn., opened its season with a concert by the city band. The pavilion which holds 2,000 people, was filled. The building is on the top of a rocky hill. The lower floor is a sort of lounging and dining room, while the upper floor is fitted up with a large stage. Windows are plenty, so that it is always cool in summer. In winter the building is heated with steam.

The Twin City Rapid Transit Company, Minneapolis and St. Paul has two resorts, Lake Harriet, Minneapolis, and Como park, St. Paul. A lease has been made for the latter for three years for \$1,000 the first year, \$1,500 the second year and \$2,000 the third year, the company agreeing to expend in addition \$6,000 a year in music alone. In winter toboggan slides will be erected, skating facilities afforded, and a winter race track conducted. The company is in the street railway circuit and will use the same attractions at both places.

The Hartford Street Railway Company, Hartford, Conn., has a new park. Concerts will be given on Wednesday and Sunday afternoons for 20 weeks.

The State Electric Company, Lyons, Ia., is preparing an attractive resort for its patrons.

The Paterson, Passaic & Rutherford Electric Railway Company will haul many passengers to Ryle Park. Picnic grounds have been prepared, which draw quite a number of people.

The Binghamton & Port Dickinson Railway Company, Binghamton, N. Y., has extensively advertised its beautiful Ross park, and its efforts are bearing early fruit.

The Easton Transit Company, Easton, Pa., has in contemplation the establishing at Island Park of "Little Germany." This is a place where one can get all the dishes so dear to a Pennsylvania Dutchman, including a glass of beer.

The South Jersey Traction Company, Bridgeton, N. J., has bought 500 acres of land, which it is developing for a summer resort.

The Sheboygan City Railway Company, Sheboygan, Wis., will maintain a menagerie at Lake View park, to entertain visitors.

The South Covington & Cincinnati Street Railway Company is building a scenic railway costing \$25,000, at Ludlow.

The Consumers' Electric Light & Street Railway Company, Tampa, Fla., has bought 320 acres along both sides of the Hillsborough river.

The Atchison Railway & Electric Light Company, Atchison, Kan., has Taylor park as a revenue producer. It is largely interested in the national game.

The Consolidated Street Railway Company, Saginaw, Mich., has made many improvements at Riverside park. A new dining hall, 36 x 90 feet, with kitchen and ante rooms, has been constructed. Several animals, including two deer, have been bought. The following privileges are let: pavilion, where soft drinks, cigars, meals, lunches, ice cream, etc., are served; fruit, popcorn, candy; photograph gallery; bath house; merry-go-round; stereopticon views. The company reserves the boating privilege for itself.

The St. Louis & Suburban Railway Company is building a theater and pavilion at Well's station. Pres. Turner has leased Romona park for five years.

The Manchester Tramway Company has leased 100 acres at East Hartford, Conn., and is laying out a park. There will be a pavilion, boats, swings, driveways, etc.

The Wheeling Railway Company, Wheeling, W. Va., is interested in a park project at one of its terminals.

The Robison Street Railway Company, Toledo, expects to have Lake Erie park opened June 21, by Innes' famous band. This resort has been built out into the lake.

The Brantford Street Railway Company, Brantford, Ont., has taken hold of Mohawk park. There is a station, pavilion, refreshment booth, cricket crease, base ball grounds, foot ball grounds and tennis courts. A caretaker, sworn in as county constable, will keep order. A windmill will supply water to pipes for watering grass and flowers. Band concerts will be given one or two evenings each week.

The Citizens' Street Railway Company, Indianapolis, will have many attractions at Fairview park.

The Marinette Street Railway Company, Marinette, may extend its line to Bay Shore, and build a club house.

The Milwaukee Street Railway Company will regale the citizens of that city with band concerts. A new park, to cost \$150,000, is projected for South Milwaukee.

The Metropolitan Street Railway Company has bought Chelsea park, Kansas City, Kan., 50 acres, for \$20,000, and will add to its attractions. It is one of the most beautiful natural parks in the two cities.

The Gloucester & Rockport Street Railway Company, Gloucester, Mass., has established a beach resort with all the adjuncts of a miniature seaside resort.

The Baltimore Traction Company has made many improvements at Gwynn Oak park, including a dining hall, 100 x 60 feet, with necessary out buildings.

The Consolidated Street Railway Company, Grand Rapids, Mich., will maintain a high class of attractions at Reed's lake and North park.

The Cincinnati Street Railway Company will give concerts in the public parks, for Cincinnati is a musical center.

Adolph Sutro, mayor of San Francisco, is rebuilding the Cliff house at Sutro Heights. This is the most famous street railway revenue producer in the world, and was fully described and illustrated in the January REVIEW.

The Electric Railway & Power Company, Sedalia, Mo., has Brown Springs and Forest park for breathing places.

The Joplin Electric Railway & Motor Company has a park at Center Creek, Carthage, Mo., known as Lake Side park.

General Manager Baumhoff, of the Lindell Railway Company, St. Louis, has found women swimming matches a good drawing card for Forest park.

W. Worth Bean, of St. Joseph & Benton Harbor, Mich., Electric road, had a grab bag attraction to increase travel. No one was permitted to draw who could not show a return street car ticket. It was a great success.

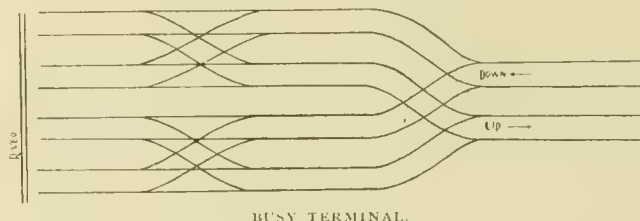
The Seattle City Railway continues its famous menagerie, seal tanks, and elaborate floral exhibitions. Operas and plays will be given in its auditorium.

The West End road, Denver, controls an immense park, enclosed with high board fence, where aquatic and other exhibitions, concerts and operas will be given.

The Cleveland City Railway will operate its base ball park, and also its amphitheatre entertainments.

NEARLY FOUR CARS EACH MINUTE.

Quick work is done at the foot of Woodward avenue during the rush hours, by the Detroit Citizens' Railway Company, where nearly four cars are handled every minute, including the uncoupling and coupling of trailers. A. E. Peters, the new secretary of the company, has kindly furnished us with a sketch of the terminal, which gives an idea of how the cars are handled. Every 30 minutes, from 4:45 to 6:15 p. m., 102 cars arrive and depart from this point, 20 being trailers. They are divided as follows: Woodward avenue line, 29 cars; Grand River



BUSY TERMINAL.

avenue, 17; Michigan avenue, 12; Gratiot avenue, 10; Myrtle street, 9; Brush and Russell streets, 7; Crawford street, 8; Trumbull avenue, 7; Chene street, 3.

"This plan," writes Mr. Peters, "necessitates the holding over of one trailer each trip, upon the lines which are operated with trailers. It is anything but satisfactory, and we are now trying to arrange for loops, which will enable us to handle our cars in much better shape."

Without looking, can you tell whose ad is on the piece of blotting paper you have just used? Do you know whose calendar hangs over your desk? Have you one single time read the ad on the leaf of the calendar pad that you tear off every once in a while for the last several days? Come to think of it, can you, unless you are a cycle enthusiast, tell which company sent you the pad? Your answer might help you in determining the value of advertising novelties.—Printer's Ink.

MOST COSTLY CAR IN THE WORLD.

That old car of the Chicago General Railway Company which tried to make the famous trip across Twenty-second street was worth \$300,000. A casual look at it would not have impressed anyone with the fact that it was so valuable, but the owners have sued the Chicago City Railway Company for \$300,000 for destroying it. The REVIEW is the proud possessor of a portion of one of the wheels, a seat support and a piece of kindling wood, which it appreciates more than it did, as they must be worth about \$1,000 each. If the company secures judgment we will put in a claim. The Chicago General Company is confident of winning its case, as the appellate court has handed down a decision in an injunction suit against the company, which says: "The street is servient to the public for its use; and neither by the authorities of the city nor by the consent of the abutting property owners can the public be excluded therefrom."

A few days before beginning the damage suit, the Chicago General Railway filed a bill for a perpetual injunction to restrain the Chicago City Railway Company from interfering with its use of the tracks on Twenty-second street from the bridge to Grove street, a distance of about 300 feet. This is the disputed piece of track on which the battle was fought as described in the last issue of the REVIEW. It is the intention of the Chicago General Company to bring several actions to simplify matters so that each of its points may be passed upon separately. The arguments on the bill will be heard, if reached, on the third Monday of May.

The bill charges that the Chicago City Railway Company has not in any wise fully or adequately performed and discharged its duty to afford proper transportation to passengers who desire to travel along Twenty-second street, but has only kept the street and operated a railway so far as it deemed necessary for the purpose of holding possession and excluding other common carriers. To show that other carriers are needed, the bill recites that about 200,000 people desire to be carried beyond Grove street and even beyond State street, which is 3,400 feet east. The company alleges that it made every effort in its power to discharge its duty as a common carrier by making arrangements to extend its line. On July 31, 1894, negotiations were begun with the Chicago City Railway Company for the purpose of extending the Chicago General line to Canal street, which intersects Twenty-second street about 50 feet east of Grove street. The City Railway made no objections and entered into negotiations, which it was hoped would result in a satisfactory agreement. The bill alleges that it was understood and agreed that the Chicago General tracks should be extended across the bridge and connected with the City Railway tracks at Grove street, and that the expense of reconstructing the tracks and making the connection east of the bridge should be borne by the City Railway, and that in accordance with the agreement the former company prepared for the work and deposited \$2,000 with the city. The substructure of the bridge and the

approaches were rebuilt by the city, and rails were laid to Grove street by the Chicago General Company. The city rendered a bill for \$2,990, less public benefits of \$500.

The bill maintains that the City Railway Company had full notice and knowledge of all the plans and purposes of the Chicago General Company, and entered into and co-operated with the same without any substantial objection, and thereby consented and became a party to such reconstruction and repair. By such consent, it is claimed the City Railway became and is absolutely barred from any subsequent opposition thereto and interference with the rights of the Chicago General Company, and absolutely estopped to question its right to operate its cars along the street in accordance with the authority granted by ordinances made a part of the bill.

The bill continues: "The obvious natural effect of the extension of the operation of your orator's lines of railway over and beyond Twenty-second street bridge, would be to increase the number of passengers who would seek passage on the various lines of railway of the said Chicago City Railway Company; and would thereby afford ample compensation to said Chicago City Railway Company for any use by your orators of the railway tracks laid by said Chicago City Railway Company; but your orators do not admit any legal or equitable right of compensation in said Chicago City Railway Company for any use which may be made of said railway tracks or of any other part of the said public highway, Twenty-second street, by any other person or persons, vehicle or carriage in passing along the same, forasmuch as the said Chicago City Railway Company has not, nor can have, under the constitution and laws of this state and the ordinances of said city, any exclusive right to said street or any part thereof, but the same is and must at all times be free to the public, subject to such regulations as the public authorities may from time to time prescribe."

In support of this point the bill recites that "under the constitution of the state all railways are and must be public highways, and free to all persons for the transportation of their person and property thereon, under such regulations as may be prescribed by law; and until such regulations shall have been made by lawful authority, all such railways must be free like other public highways; and that no exclusive right in any public street can be obtained by any railway company, but that such companies must conduct their business in such a manner as not seriously to interfere with or exclude the general public therefrom."

The bill says the state has delegated authority to the city to "regulate the use of streets, to regulate traffic thereon, and to regulate the laying of railroad tracks; and that the Chicago General Company is duly authorized thereby to connect its tracks with those of the Chicago City Railway Company, and to operate its cars over the tracks laid down, without unnecessary interference with the cars of the Chicago City Railway Company, and subject to the limitation that not more than 5

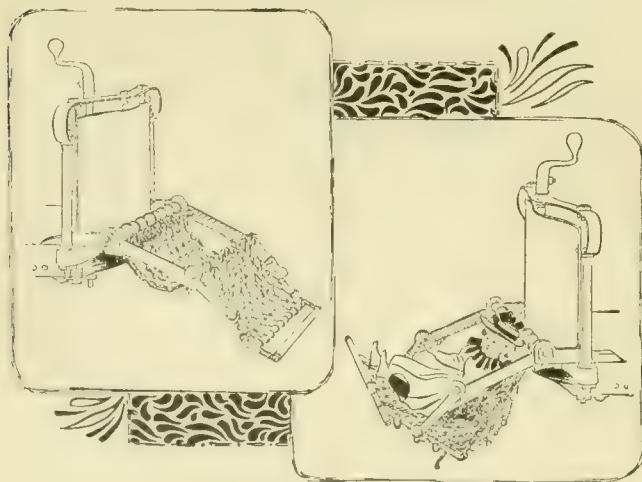
cents shall be charged for one continuous ride for any distance within the present or future limits of the city."

Then comes the story of the attempt to run the car and the resistance of the City Railway. The bill complains that the destruction of the car and obstruction of the street were not a mere trespass for which an action for damages would afford any substantial or adequate remedy, but were a serious obstruction to the business of complainant, and if the same should be continued great and irreparable wrong and injury would be inflicted, as eventually all the Chicago General cars would meet the fate of its sacrificial car, depriving it of a large amount of gains and profits which could not be definitely ascertained.

It is charged that in not applying to the courts for redress, but in organizing a private armed force and in waging war against the Chicago General Company, the City Railway has been guilty of a scandalous abuse of its corporate powers and privileges, and has incurred a forfeiture of the same which ought to be tried and adjudged against it at the instance of the public authorities. The bill states that the defendant company employs several thousand persons to maintain its lines, and thus has the physical power, if permitted to use the same, of opposing and preventing by force and violence, any attempt to enter into competition with it in the transportation of persons through the city of Chicago. A perpetual injunction is asked.

IS PURELY AUTOMATIC.

It is purely automatic, and is warranted to literally pick a person clear off of the ground without injury, brush his clothes, give him a cigar, or drink, open the door of the car, extract from his pocket the price of a fare, find him a seat, and take him to his destination, all in one operation and in so short a time that it seems incredible. The fender illustrated herewith, was dreamed. Albert



THIS FENDER WAS DREAMED

Edwards was injured by a trolley car, and lost three toes. The company offered to settle for \$500, which so enraged him that he determined he would get even by

fixing it so that nobody else could get hurt. He studied, and studied, until weariness compelled him to sleep. Then he dreamed, and the result of his dream is before our readers. This is the first time on record that a dream has been seen by other than the dreamer, this one being backed by several thousand people who have seen it work.

NEW RAILS FROM OLD.

If subsequent practice gives as good results as past and present experiments seem to promise, there may be less business for steel rail mills. E. W. McKenna, for 30 years connected with railroad management, and who occupies the position of general manager of the Great Northern Railway Company, has patented a process of renewing old steel rails. A license to operate under the patents has been given the Pioneer Rail Renewing Co., incorporated under the laws of Wisconsin, with Otto H. Falk, Milwaukee, president; Thomas H. Blair, Jr., metallurgical engineer, Pittsburg, vice-president; Edgar C. Hoe, Milwaukee, secretary; James S. Prentice, Chicago, treasurer. The company has a Chicago office at 811 Monadnock building, and has leased the north works of the Illinois Steel Company, which it is adapting to its purposes, and expects to be ready for business in 60 days.

The old rails are heated to 1,500 to 1,800 degrees and passed through rolls, which reduces them in weight and slightly lengthens them. Rails of 75 pounds section or over can be renewed several times and still be of sufficient weight to render efficient service on lines of heavy traffic, and in their succeeding lives be transferred to lines of lighter traffic, where the lighter section being in right proportion to the traffic and speed of trains would render entirely efficient service. Experts who have investigated the whole matter are fully confident that, in ordinary practice, using a low heat for the roughing pass and a still lower heat for the finishing pass, the metal in the rail will be improved by the process and give better results in wear than the rails gave in their first life.

The patent covering this process is fundamental. There was nothing preceding it in the patent office that touched on the subject of renewing old steel rails. There are a number of patents for machines for utilizing the stock in old steel rails for other purposes, but nothing that suggested the restoring of an old steel rail for its original purpose. The patent consists of two steps: (1) Heating below the decarburizing point and (2) replacing the displaced metal. It is estimated that the loss of transverse section will not exceed 4 per cent to 5 per cent of which about 2 per cent will represent the actual loss by oxidation, as the balance will be saved in the elongation of the rail. There is no change in the chemical constituents and the physical properties of the rails are improved.

Steam roads have two methods of utilizing worn out rails—one is the scrap heap and the other is to saw off the ends. Estimates on a basis of a mile of 67 pound section rails show great economy in favor of the renewal

process. The return to the railroad per ton would be by selling as scrap \$6, by sawing \$10.16, by renewing \$17.71. The loss by sawing would be so great, that only $\frac{57}{100}$ of a mile of track could be relaid, while by the new process more than a mile would be laid on account of the elongation of the rail.

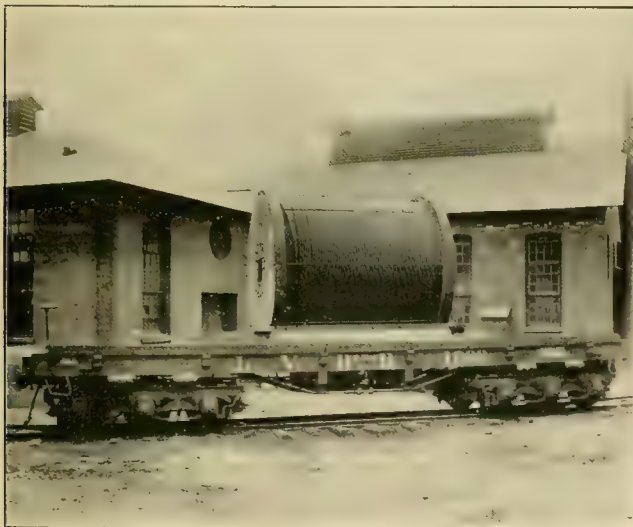
By renewing, the rails of one mile of track as above, would produce: loss by wear and oxidation, 1.5 tons; loss by oxidation in furnace 1 ton; crop ends scrap steel 1 ton, at \$6; renewed steel rails 101.5 tons at \$23, \$2,334.50; total \$2,340.50; less cost (to railroads) for renewing at \$5 a ton, \$507.50; balance, \$1,833.

The company expects to be busy for a long time on steam road business, and estimates its capacity at 200 tons a day, or 60,000 tons a year, working double turn 24 hours a day. Other plants will be operated in favorable locations. The company figures the total cost of production single turn, on a basis of 100 tons a day 30,000 tons a year, will be \$2.43 a ton; and working double turn, \$1.91 a ton, which leaves a large margin of profit.

No plans have been made to take care of street railway work, although something may be done later, if facilities can be secured.

SIX MILES LONG WITHOUT A SPLICE.

There are one or two heavier cables in use in the United States, but the one shown herewith is not a light weight by any means, as it tips the scales at 121,175 pounds; the gross weight of reel and cable being 127,875 pounds. This is the heaviest shipment ever made by the Hazard Manufacturing Company, Wilkesbarre, Pa., and is shown on a car ready for transportation to the Metropolitan Traction Company, New York, for the Columbus avenue division. The rope was 31,800 feet long, 1½ inches diameter and of the best English steel wire, the cable

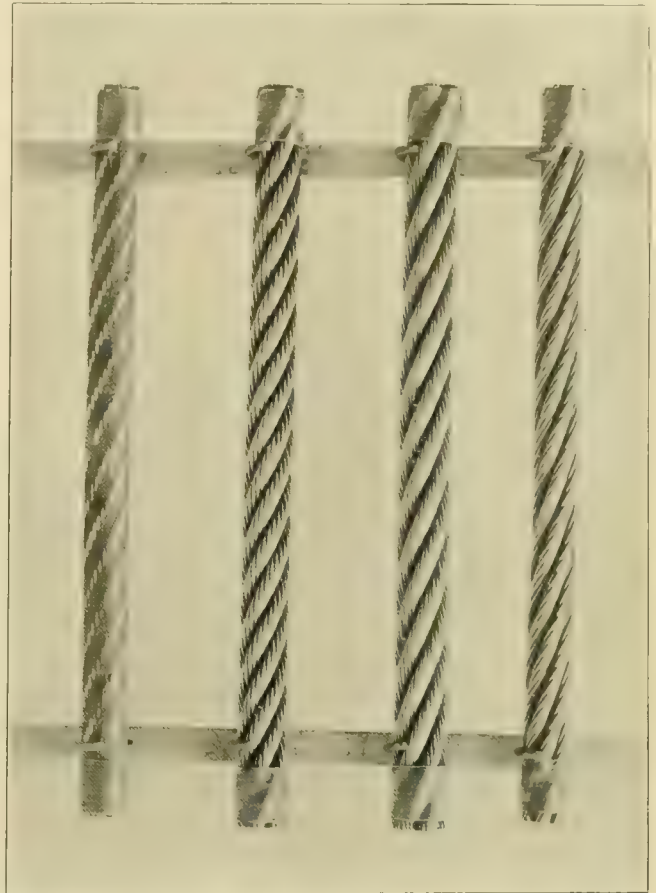


READY FOR SHIPMENT.

being made in one continuous length without a splice. When the reel arrived in New York it was loaded on a truck and drawn by forty-two horses to the power house.

The other illustration shows various styles of construction of cables. The one on the left is a Hazard rope after long use.

A force of thirty men was required to engineer the



HAZARD ROPES.

transfer of the heavy load. Two horses were harnessed abreast in the shafts, and four abreast in front. The start was made about 6 o'clock in the morning and the destination was reached a little before 10 o'clock. The route was selected with a view to travelling over the most substantially paved streets and, at the same time, affording the least interruption to street car traffic.

The greatest difficulty in moving this enormous load was encountered at the outset of the journey, because of some ruts into which the wheels of the truck had slipped. Once clear of these the forty-two horses dragged their great burden with comparative ease, though at a snail's pace.

The journey was accomplished without accident and comparatively little damage to the streets, though two manhole covers were broken, and the flagging at several sidewalk crossings was badly cracked.

The passage along Fifth avenue was effected before that fashionable thoroughfare was thronged with churchgoers, and so escaped notice, except of people returning from early services. At Forty-second street and Fifth avenue there is rather a sharp decline northward on the avenue. To prevent the truck from running down upon

the heels of the horses, it was necessary to rig up a novel brake.

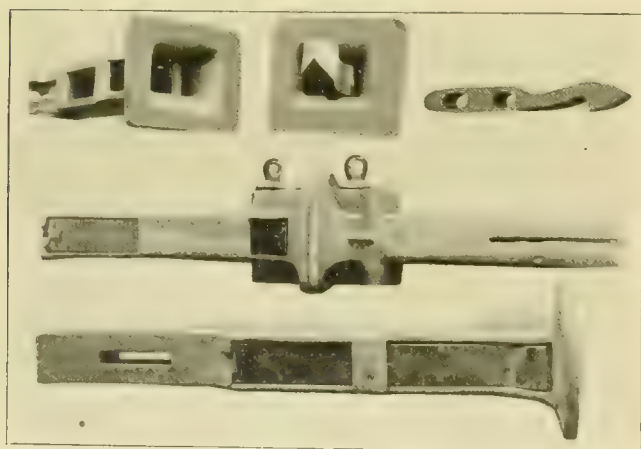
A heavy platform truck used for carting railroad iron was attached to the rear of the spool truck. The wheels of the former were secured by ropes from turning. Being thus made to drag over the pavement it served as an effectual brake. At the foot of the grade the second truck was detached without stopping the spool truck.

Much delay occurred at Fiftieth street. The room being insufficient to turn, it was necessary to slew the forepart around with a hydraulic jack. The rest of the journey was without incident, except that the truck narrowly missed striking one of the pillars of the elevated railroad structure at Sixth avenue.

Arrived at the power house, the truck was stopped in front of a wide doorway a few feet west of Sixth avenue, and there a bridge of heavy timbers was built. When that was completed, a cable operated by a steam engine, was attached to the spool, which rolled on the timbers into the building like a cask.

VAN DORN AUTOMATIC DRAW BAR.

The Van Dorn automatic draw bar is attaining the success deserved by the only automatic street railway draw bar on the market. It is now in use on over 50 street railways, and new companies are added each week. These draw bars are on 500 cars of the Milwaukee Street Railway, 500 cars of the Electric Traction Company, Philadelphia, 400 cars of the Washington & Georgetown Railroad, Washington, D. C., 400 cars of the Philadelphia Traction Company, 350 cars of the City & Suburban Railroad, Baltimore, Md., 300 cars of the Baltimore City Passenger Railway, and 250 cars of the Baltimore



Traction Company. The Metropolitan Elevated is also equipped with them. The draw bar is now made in two forms. In the old style the link is permanently fastened at one end and couples automatically at the other end. In the new style it couples automatically at both ends. An automatic coupler is a life saver, and as such is a good investment. The Fitzgerald & Van Dorn Company, formerly of Lincoln, now of Chicago, has recently

begun to make its draw bars so perfectly machine-fitted that they couple with only $\frac{1}{32}$ -inch play. A special form has been recently designed for use on the suddenly changing grades at Kansas City.

ABOLITION OF HEADLIGHTS IN MILWAUKEE.

The cars of the Milwaukee Street Railway now run without headlights, night and day. Seven months ago, C. D. Wyman, general manager, believing that the headlight is more of a hindrance than a help to the successful operation of a street railway, discontinued its use. The experiment has been so successful that the practice has been continued up to the present time. Mr. Wyman's reasoning was, that from the motorman's standpoint, the abolition of the headlight was very desirable, while the pedestrians on the streets have the gong, the car lights and the tracks to warn them of the presence of cars. An electric car often travels fast enough, so that the headlight is worthless in revealing objects on the track in time to prevent running over them. A headlight throws a bright light for a few feet ahead, and all beyond that is in a shadow, as it appears from the front platform. This prevents the motorman from seeing the very part of the street that he ought to see. It is unnecessary to dwell on the expense and fire risk of oil headlights. Mr. Wyman thinks that an electric railway should be operated through the streets as quietly and unobtrusively as possible, and that in the past, there has been too much clang, crash and rattle in the operation of a road. Taking off the headlights is a step in this direction.

STREET RAILWAY GAZETTE CHANGES OWNERSHIP.

The Street Railway Gazette, with all its assets, has been purchased by W. J. Johnston, publisher of the Electrical World, New York, and will hereafter be issued from that office. The Gazette was started in Chicago in 1886, as a monthly, and changed to a weekly, in 1892. The following year it was removed to New York. Several modifications are announced. The size of the page will be slightly reduced, and the number of pages considerably increased. Clarence E. Stump, general manager, and J. W. Dickinson, editor, will still be connected with the paper. We wish for its new owner the same success he has achieved in so marked a degree with the Electrical World.

The spring must be a little backward in Minneapolis, judging from what our contemporary, Electricity, says in its issue of April 3, as follows: "The Street Railway and Electrical News for January is just at hand. The most interesting features are a report of the meeting of the Northwestern Association held that month at Milwaukee, and a full page advertisement of the Great Western Manufacturing Company, which died last year."

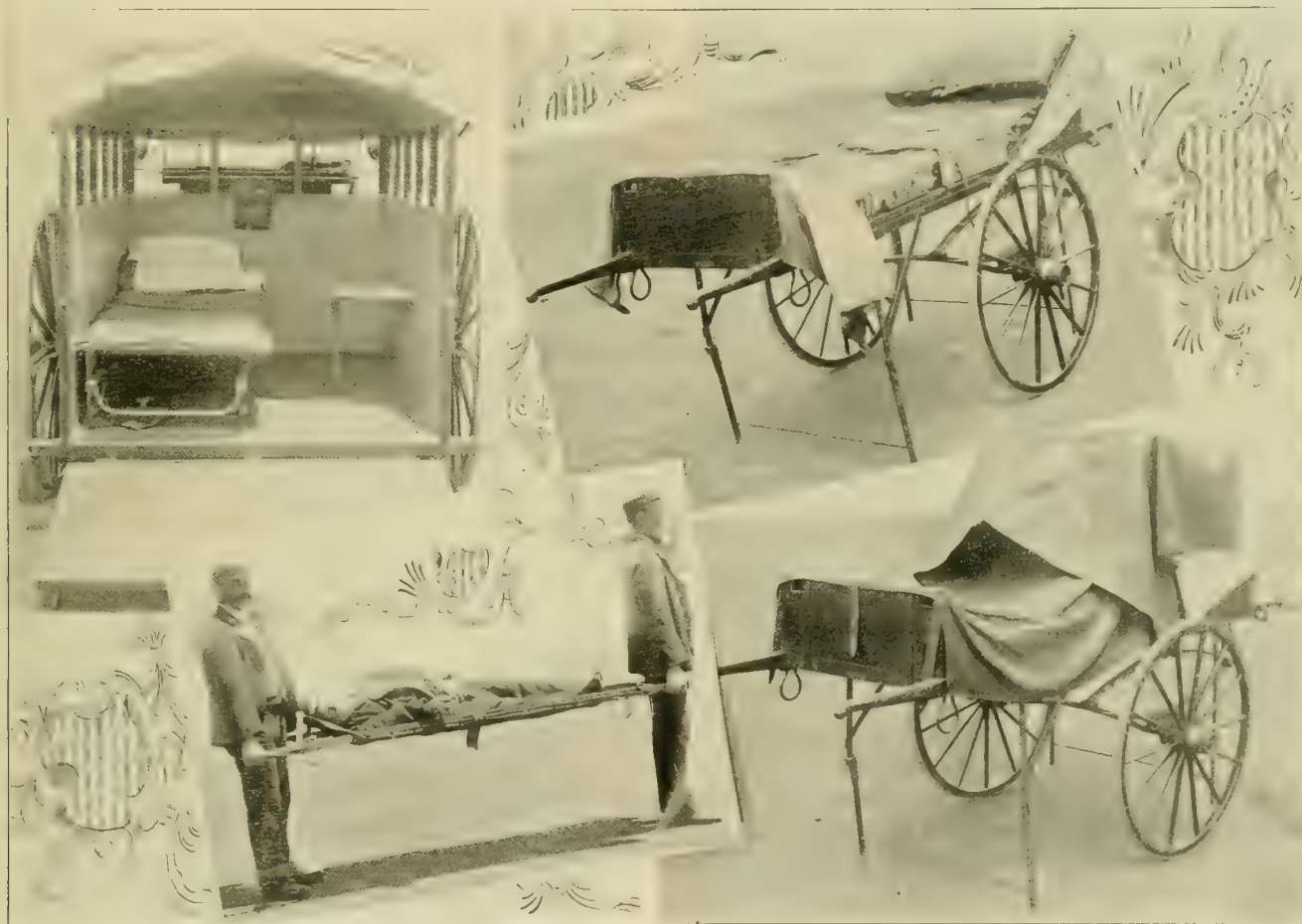
TRAMWAY AMBULANCE SERVICE.

Aid to the injured, if given immediately after an accident, will often prevent dangerous complications. In New South Wales the employes of the steam and street railways are organized into a voluntary ambulance service, which has a membership of 1,000. Frequent drills are had and examinations are required, so that there is an efficient force of amateur surgeons that is capable of giving invaluable aid in case of accident. The corps is supplied with ambulances, stretchers, medicines and other necessities, but has no specially built car like that on President Scullin's line in St. Louis.

The New South Wales Railways & Tramways Ambul-

branch; 17, permanent way branch; 8, interlocking, stores and tramway branches. The corps had been established 3½ years.

The commissioners, soon after taking office, gave particular attention to this ambulance question, affording every facility for the instruction of the men and offering special incentives in the way of prizes and prize money to be annually competed for for the furtherance of the progress of the corps. This has caused largely increased zeal in connection with the movement; and at the date of the last report upon the transactions of the year 1894 the committee were able to report that the numerical strength of the corps had reached 892 members, and that it was confidently expected that in less than six months



INTERIOR AMBULANCE WAGON.
STRETCHER EQUIPMENT FOR ACTION.

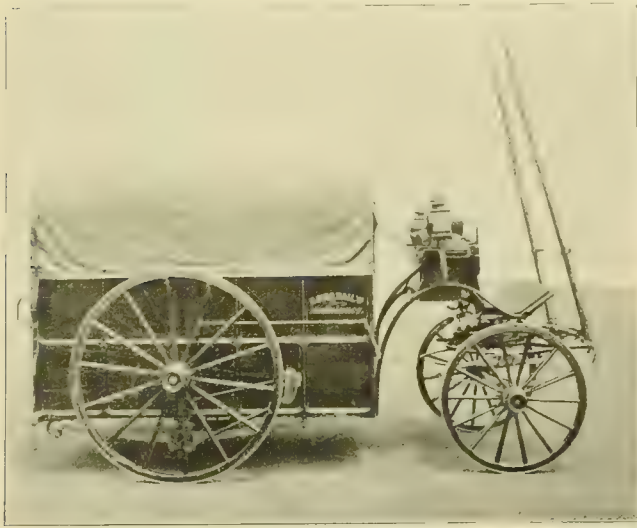
WHEELED LITTER.
COVERED LITTER.

ance Corps was organized in 1884, when the authorities felt that an ambulance corps in connection with the railways and tramways would be a most useful branch of training for the staff, and would also have a practical and beneficial effect in the case of accidents occurring on the railway and tram lines. A special committee was appointed to formulate regulations for the instruction, examination and admission into the corps of such employes as desired to avail themselves of the benefits. In 1888, when the present railway commissioners took office, they found the corps with a membership of 191, being 119 from the locomotive branch; 47, traffic

the corps would number 1,000 strong. There are now established 24 branches of the corps, the members of which are distributed at 121 stations, many being in places miles distant from the nearest surgical aid; and that during 1894 instruction was given at 30 different centres, and, including monthly drills, no less than 530 meetings were held. There is hardly a length of track of 20 miles in which an ambulance man would not be found.

During the past year 200 cases were reported to the corps secretary, in which good service had been given by members in rendering first aid in connection with accidents which had occurred during the year to members

of the staff and others outside the department. The prompt and efficient aid, too, which was rendered by members of the corps in the unfortunate accident which



AMBULANCE WAGON.

occurred at Redfern on October 31 last, was a theme of praise by all who witnessed the exertions of the ambulance men and the promptitude with which they removed a number of injured persons in comparative comfort on suitable stretchers, at the same time that they gave to each case the skilled attention which goes so far to alleviate suffering under such deplorable circumstances. There were about 40 persons injured, and within 15 minutes of the occurrence of the accident all were removed from the scene of it.

The operations of the ambulance corps are directed by a committee consisting of a president, vice-president and eight ex-officio members. In addition to these, each branch elects a representative working member to a seat on the committee in order to look after its interests. Annually, or twice annually, a course of lectures is delivered at Sydney and at the principal country centers by the railway medical officer; and on requisitions from other points being sent in to the committee, classes are formed which are conducted under the supervision of the medical officer by either a local medical man or a competent passed member of the corps. Following upon these instructions examinations are held consisting of a preliminary and final, the passing of the first securing corps membership and the issue of a framed certificate signed by the railway commissioners, the passing of the second entitling the successful candidate to the possession of the corps medal. In this way new members continue every year to be enrolled, and the corps strength goes on increasing.

The ambulance equipment consists of the following: 1 ambulance wagon, 5 wheel litters, 206 stretchers, 83 chests and 38 hampers. The ambulance wagon and one wheel litter are kept at convenient places at the Metropolitan headquarters; the other wheel litters are stationed at important centers. A chest and stretcher are placed

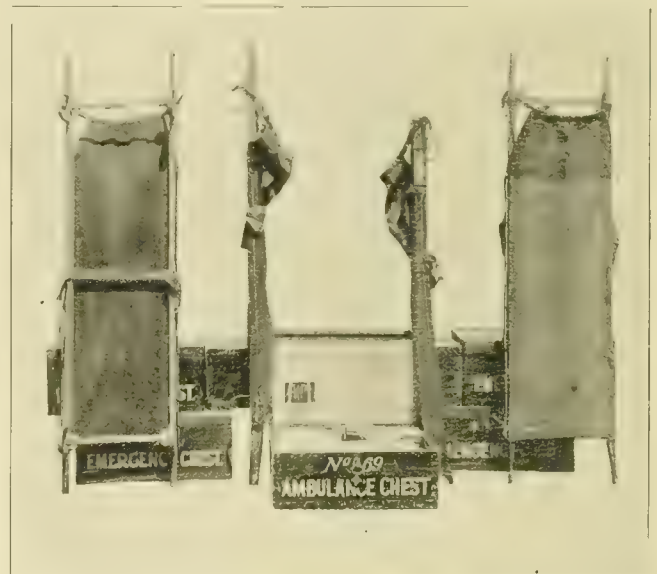
in the brake van of each long journey train and all mixed trains on branch lines, in order that in case of any accident occurring, they may be available for immediate use. Stretchers and hampers are placed at all the more important stations, where they are at all times accessible. All accident vans are equipped with ambulance appliances, and in each gang are enrolled members of the corps.

The expenditure of the corps is kept within a very small compass considering the amount of work which is done, the total cost of the last year having amounted to \$640, only exclusive of medical officer's salary and of a gratuity of \$500 granted by the commissioners, for division among members of the corps who during the year attended 10 or more of the 12 monthly drills held. In this distribution 87 members of the corps participated.

Although stretchers and hampers are supplied so freely, members of the corps are principally trained to use improvised material, so that under any circumstances they are able at very short notice to render efficient first aid. Many of the ambulance men evince much cleverness and dexterity in improvising this material, and are encouraged as much as possible to do so.

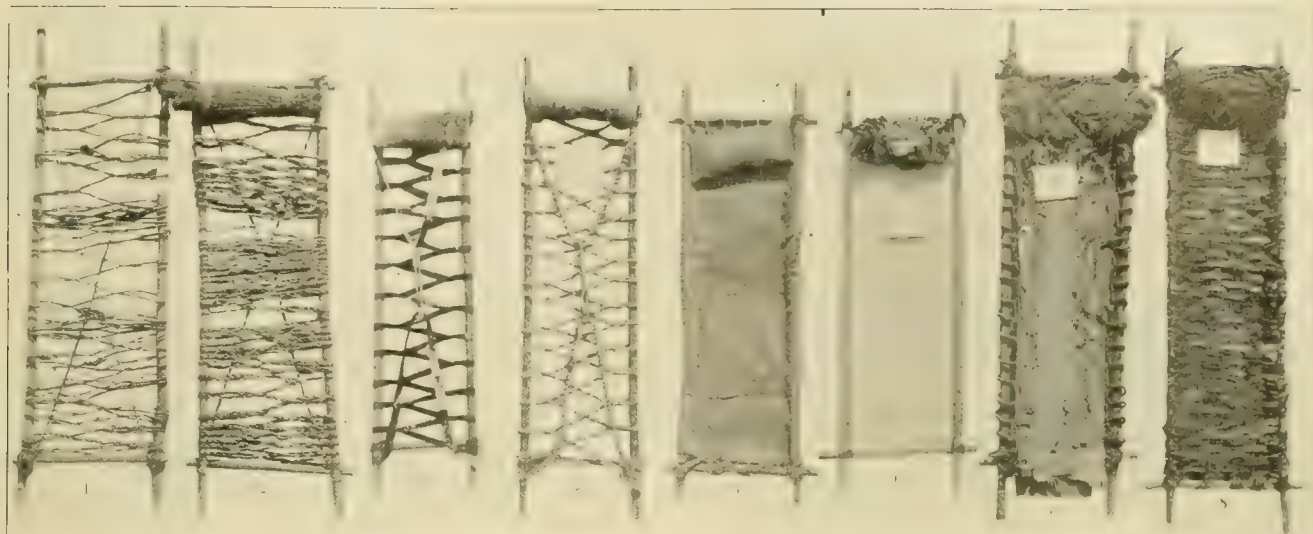
Of the improvised stretchers shown in the illustration, No. 1 is made of sarsaparilla vine; No. 2, plaited rushes; No. 3, rawhide strips; No. 4, grass; No. 5, sugar bags; No. 6, wire netting; No. 7, stringy bark, twisted; No. 8, stringy bark, strips.

The contents of the ambulance chest are assorted splints for arms, legs, etc.; 18 triangular bandages; 6 roller bandages, 10 yards long, 6 inches wide; 12 roller bandages, 6 yards long, 3 inches wide; 2 reels adhesive



STATION AND BRAKE VAN EQUIPMENT.

plaster, 4 pounds tow; 2 pounds cotton wool; 1 pound surgical lint; 1 pound carbolic ointment; 1 pint carbolic oil; 8 ounces aromatic spirits of ammonia; 2 graduated measures; scissors and a book on accidents and their treatment. Directions for use of these remedies are attached to the cover of the chest.



IMPROVISED STRETCHERS—NEW SOUTH WALES TRAMWAY AMBULANCE CORPS.

Our illustrations show an ambulance wagon, side and rear view, wheel litter, with and without cover, station and brake van equipment, stretcher for action, and eight styles of improvised stretchers.

The information and photographs of this admirable and valuable institution were furnished us by A. Richardson, vice-president of the ambulance committee and comptroller of stores of the New South Wales Government Railways. We are also under obligations to John Parry, outdoor superintendent.

REPORT OF THE LIVERPOOL ELEVATED.

The report of the Liverpool Overhead Railway for the half year ending December 31, 1894, has been published, and the following statement, figured in American money is of special interest at the present time, because the trains and traffic on this road are very similar to those which will be used on the longer interurbans, and the steam roads that are being changed to electric in this country.

EXPENDITURES.

	Cents per train mile.
Maintenance of way, power plant and stations.....	4.005
Motive power, (includes repairs on motors).....	6.430
Repairs and renewals of carriages.....	.343
Traffic expenses.....	10.185
General charges.....	3.063
Law charges.....	.011
Compensation.....	.001
Rents and taxes.....	1.888
Government duty.....	.009
Total.....	25.935

Thomas Craig, president of the Geneva & Waterloo, N. Y. Railway Company, has been chosen general manager of new consolidated Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company.

NEAT WAITING ROOM.

At a recent meeting, members of the Cleveland Architectural Club submitted designs for a waiting room suitable for erection in the public square at Cleveland. As some street railway companies may contemplate building something of this sort, the REVIEW reproduces the best



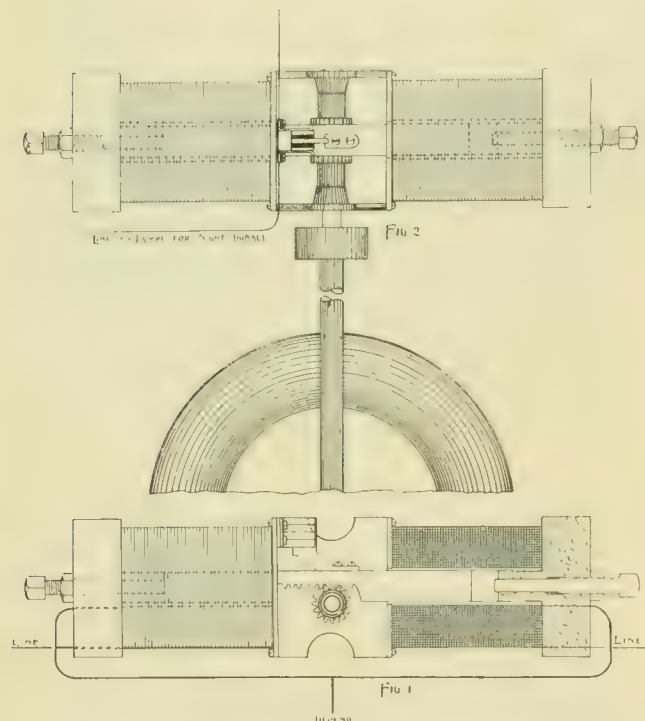
NEAT WAITING ROOM.

design, which is by Benjamin S. Hubbell. If a waiting room was to be built it would have to occupy the space between the curb and sidewalk, which was 15 feet on one street and 13 feet on another. The design contemplates the filling of the space between pillars with plate glass, so it will be enclosed for winter. The cost is about \$1,000.

King & Andrews Company, Chicago, western manufacturers and agents of the composite brake shoe, report a good business. The special claim for this shoe is, not that it will stop the wheels of a car suddenly, permitting it to shoot ahead under its momentum, skidding and flattening the wheels, but will gradually, and in less distance, bring the car quietly to a stop without the usual jerking and jumping, and with much less danger of flattening the wheels. It is also claimed that a car equipped with this shoe will be more easily handled by the motor-man and will give a largely increased service.

THE BLOCK SIGNAL USED AT MUSKEGON.

Block signals for use in places where there is danger that cars will meet on single track are becoming more numerous every day. One of the most substantial yet constructed has been in service for eight months on the

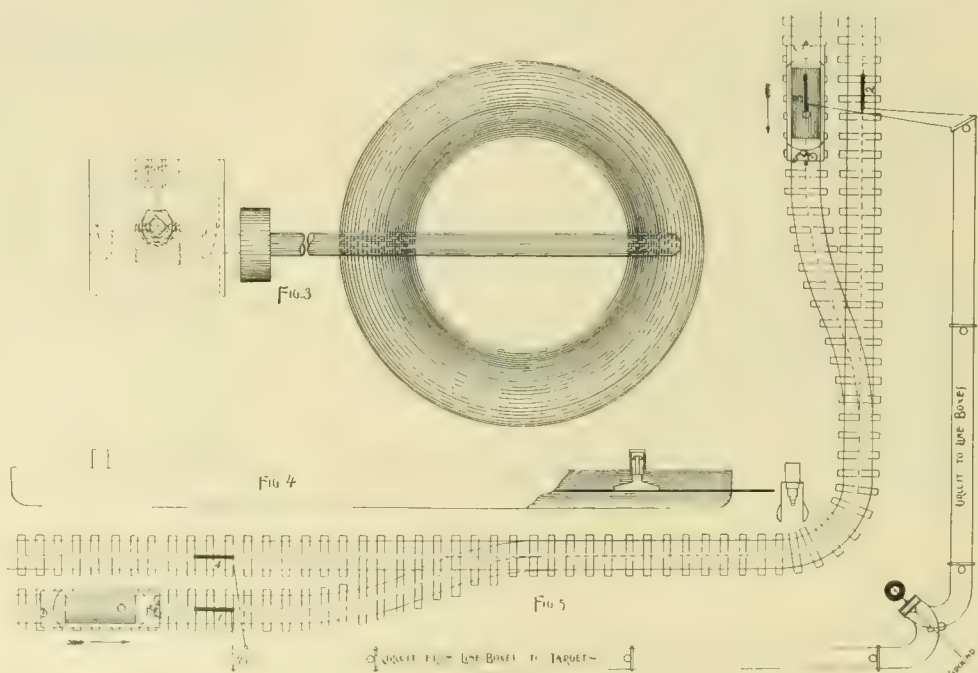


Muskegon Railway, Muskegon, Mich. Superintendent Fred W. Thompson is very much pleased with it, and says that it works admirably and that they could not get along without it. The device is the invention of C. H. Shaffer, president of the Electric Alarm Company, of Muskegon Heights. The semaphore operating mechanism is shown in Figures 1, 2 and 3. The semaphore shaft is geared by a rack and pinion to the solenoid cores shown. A current in one solenoid draws the core one way and turns the semaphore to danger. A current in the other solenoid draws the core the other way and turns the semaphore to safety. The core is limited in its movement by the stop screws in the heads of the solenoids. This arrangement allows the adjustment of the target to horizontal and perpendicular positions. On the inside end of the left hand solenoid, Figures 1 and 2, is shown the electric light circuit switch which lights a series of lamps on the semaphore which take the place of the

target at night. Figures 4 and 5 show the arrangement of circuits for operating the signals. In Figure 5, 1, 2, 3 and 4 are devices for making connection between trolley wire and signal wire when a trolley wheel passes along. Figure 4 shows the device in detail. The box over the trolley wire is made of a single piece of sheet metal. The box is supported near each end by metal posts resting on the trolley wire and insulated from the box. The box is connected with the semaphore. Thus, when a trolley wheel passes under the box, a connection is established between the signal and the trolley wire. Figure 5 shows the semaphore in position as used on a single track curve at a street corner. To illustrate its working, suppose that a car passes line box numbered 1. The trolley wheel makes connection with the danger side of the solenoid and the target is turned to danger and lamps lit. A car approaching box 3 would then know that there was a car on the single track and that it must wait. The first car in passing box 2 sets the signal at safety again.

COULD NOT BUY CAR TICKETS.

E. W. Hale, et al., dry goods merchants of Sacramento, Cal., have been in the habit of buying tickets of the Central Electric Railway Company to be given or sold to their patrons at cost. The fare is 5 cents, but tickets are sold 22 for \$1, and school passes 40 for \$1 for persons not over 15 years of age. The dry goods firm has begun suit against the car company for \$5,000 damages, claiming that it now refuses to sell to the plaintiff a greater quantity at a time of the school passes than ten, twenty, or forty, and then only at such times as the defendant corporation may choose, and not as demanded or required by the plaintiffs. It alleges that the corpora-

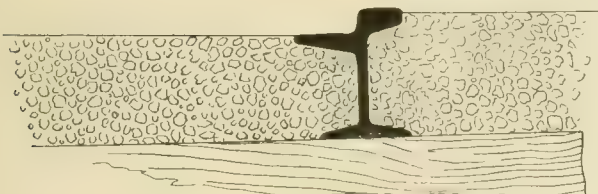
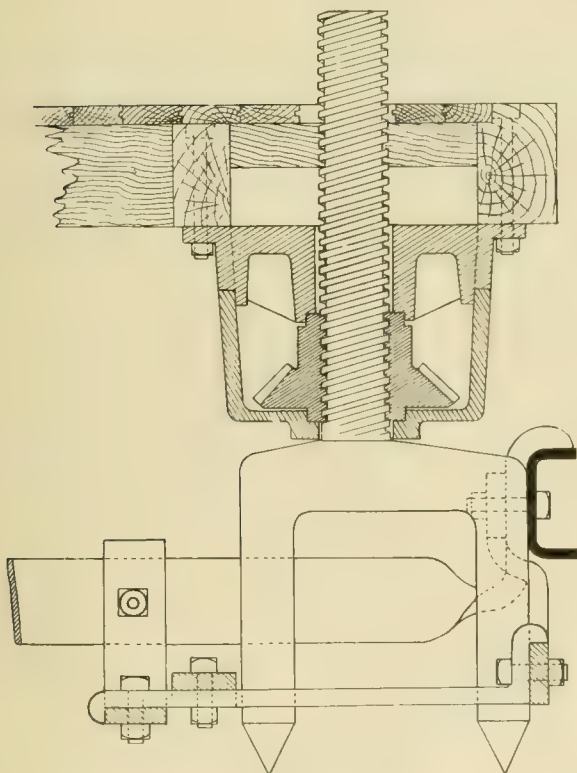
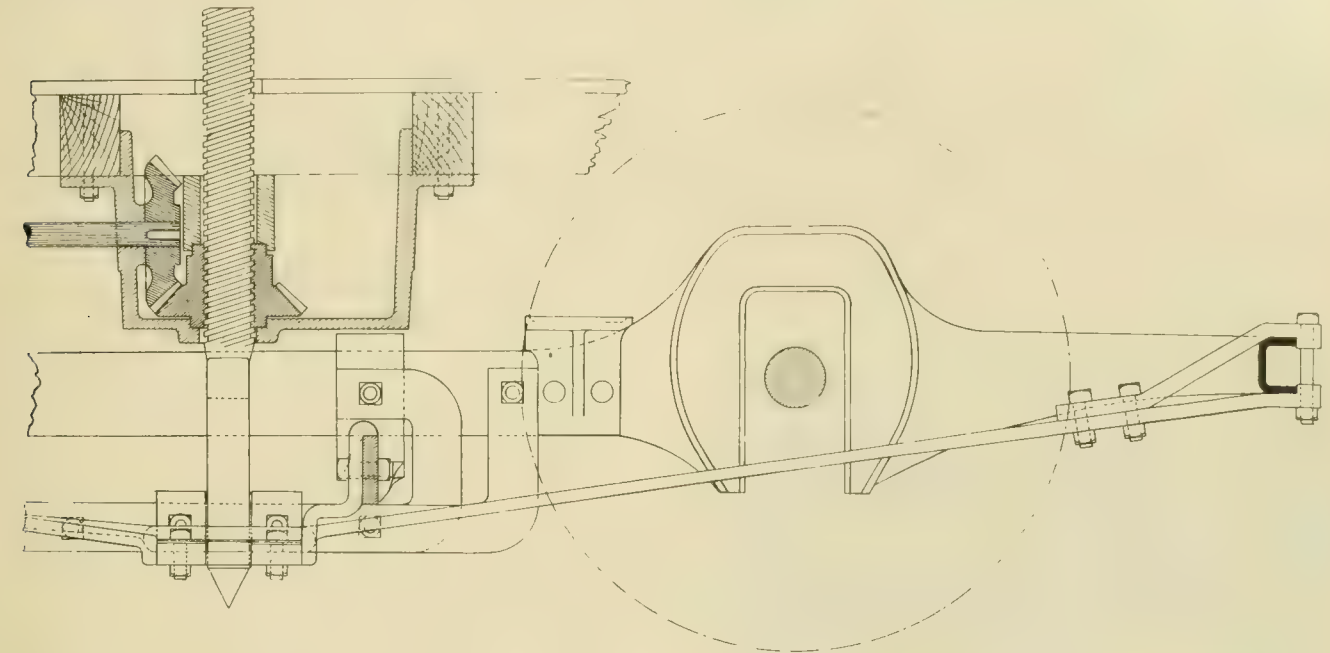


tion defendant, in violation of its duties to the public, has wrongfully, unlawfully and unjustly discriminated against

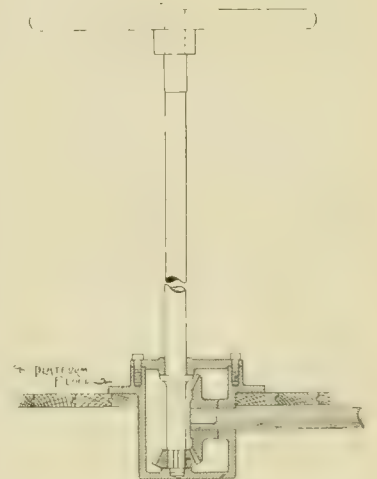
the plaintiff in the sale and purchase of such school passes and tickets. That it has sold the same in larger quantities, as requested, to a rival firm to the damage of the plaintiff.

SAFETY BRAKE AT CINCINNATI.

The accompanying illustrations show an emergency brake invented by Bayard Kilgour, of the Cincinnati



Street Railway for use on the very steep grades of that system to prevent cars running away. It is intended simply as a last resort in case the hand brakes and the emergency electric brake available with all series-parallel controllers fail. The brake consists of a pair of prongs which come down on each side of the rail and dig into the paving. The prongs are moved up and down by a worm gear operated by a hand wheel on the platform.

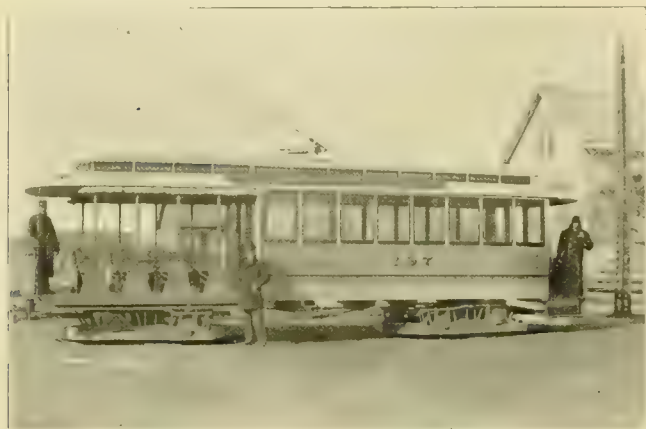


PUTTING ON CITY AIRS.

It is said that Media, Pa., has an ordinance compelling trolley cars to slow down to three miles an hour before crossing all streets of 20 feet in width or over, under a penalty of \$25 for each offence. Verily a wise provision! On the crowded streets of this metropolis of 3,000, an accident might occur which would kill off an appreciable per cent of the city's entire population, or again perchance some of the cows wandering along the suburban lanes within the city limits might come to grief if cars were not slowed down to a walk before making a crossing.

COMBINATION CARS IN MILWAUKEE.

The combination car fashion seems to be disregarding the general law of emigration, and is making its way eastward instead of westward. San Francisco came first; then Denver and Chicago. Milwaukee is the latest city in which this form has made its appearance. C. D. Wyman, general manager of the Milwaukee Street Railway, has had some Pullman cars which formerly run on the Whitefish Bay steam dummy line, rebuilt into the form of combination cars, shown in the accompanying engraving. The work was done in the company's own



COMBINATION CARS—MILWAUKEE.

shops. The car is 37 feet 6 inches over all. The closed part has a body 18 feet 9 inches long, and the open part is 13 feet 9 inches long. The width of the body is 7 feet 10 inches, and the width inside 7 feet 7 inches. From the floor to the top of the deck is 8 feet 10 inches, and the height of the deck is 12 feet. The bottom of the floor is $2\frac{1}{2}$ feet above the rail. The trucks are Brill maximum traction, with 30-inch driving wheels and 20-inch followers. The wheel base is 4 feet, and the distance between drivers 23 feet. The electrical equipment is two No. 14 Edison motors, rewound according to the company's designs, type K controllers and Thomson-Houston style of trolley. Fifteen 20-candle-power lamps are used for lighting. A five light cluster is put in the closed part, one four light and two two light clusters in the open part and signal lamps at each end.

WHAT IS A WORKMAN'S CAR?

Rather an interesting point has been judicially decided in Dundee, which determines that workmen's cars are exclusively for the use of workmen, and anyone else cannot have the advantage of reduced fares by riding therein. A master butcher, riding in a workman's car, refused to pay regular fare, which is double workman's fare. He was brought before a justice and fined, because the privilege of traveling at reduced fares on a workman's car was extended only to mechanics, artisans and day laborers.

"DAMN" IS SWEARING.

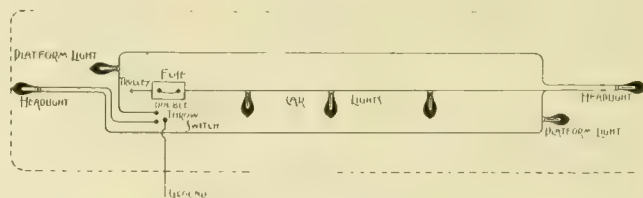
It has been judicially decided by the Maine supreme court that "damn" is swearing. Clarence L. Robinson sued the Rockland, Thomaston & Camden Street Railroad Company for damages for being put off a car by a conductor for swearing. Robinson alleged that he was put off in a rude manner, was pushed into a ditch of mud and water two miles from home with no way to reach it except by walking, that he took cold and had rheumatism in consequence, and was humiliated and disgraced in public. He secured a verdict of \$1,187.27 and the company appealed.

Judge Walton drew the opinion of the court, which was concurred in by all the judges. He said:

"We think the removal was justifiable and that the verdict is clearly erroneous, and must be set aside. Under the law of this state it is the duty of the conductor, when indecent or profane language is being used in his car, to check it, and he will be guilty of a breach of duty if he fails to do so. And if in a car filled with passengers, nearly one-half of whom are ladies, a man in earnest conversation undertakes to emphasize his statements, as some men are apt to do, by saying 'By God' it is so, or 'By God' it is not so, the law makes it the duty of the conductor to check him; and if the latter denies his guilt, and upon being assured by the conductor that he was guilty, flies into a passion and calls the conductor a 'damned liar,' it is the opinion of the court that he may be rightfully removed from the car. Not as a punishment for his insult to the conductor as an individual, but to vindicate the authority of the law which forbids the use of such language in a street car or in any other public place where women and children have a right to be. To be first falsely charged with an offense is not a license to become immediately guilty of a similar offense."

CAR WIRING FOR ELECTRIC HEADLIGHTS.

The Fort Clark Street Railway at Peoria, was recently equipped with electric headlights at a nominal cost, by its former superintendent, W. D. Allison. The reflectors for the headlights were bought of a dealer at \$1.20 apiece. The headlights were made up of galvanized iron in the



WIRING FOR HEADLIGHTS.

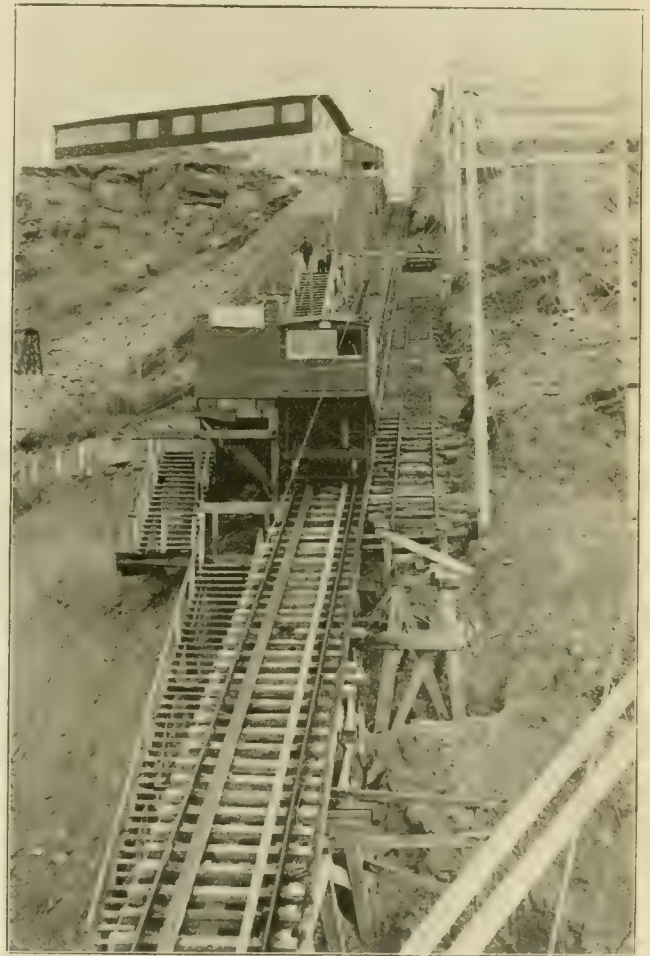
shops. The total cost of equipping a car with two headlights is \$6. The headlights are placed over the hood on each end and a switch is provided which cuts out the platform light on the end on which the headlight is lit. The car wiring is shown herewith. The lamps inside the car are permanently in circuit and a double throw single pole switch connecting to ground throws in headlights as desired.

ELECTRIC INCLINE RAILWAY AT GREAT FALLS, MONTANA.

The Great Falls Electric Street Railway at Great Falls, Montana, has a large and ever increasing passenger traffic with the Boston & Montana Consolidated Copper and Silver Mining Company's Smelters, where about eight hundred men are employed. These works are situated about three miles from the business center of Great Falls. The street railway terminates at a point on the opposite side of the Missouri river from the smelter works, on a bluff about 150 feet above a suspension foot bridge that connects with the works, for the convenience of the employees. From the end of this bridge a stairway leads to the top of the bluff. At the time of constructing its power house, the street railway company constructed a rail tramway to facilitate work in handling material and machinery. Since then it has tried, with indifferent success, various devices to use this tramway in connection with a car as a passenger hoist. The old plan consisted of a drum hoist operated in the power house, the cable passing over a sheave at the top of the tramway, and connected with the car. This proved too slow in its operation and required too much power for the results obtained. During the past summer, W. D. Dickinson, superintendent of the railway company, with his characteristic enterprise, determined to devise some better means for more satisfactory hoist service, and after considering various hoisting devices, the present electric hoist was adopted and built. We are not aware of any similar hoisting plant in the country and a description of the same may be of interest to our readers for its novelty and because other roads may have to face the same problem. Much credit is due W. S. Blauvelt, assistant superintendent, for practical suggestions. The tramway is 400 feet long, built on an angle of 22 degrees, 10 seconds from a horizontal plane, being about a 33 per cent grade. It consists of double tracks laid with 40-pound T rails. The passenger car runs on a track of standard gage, 4 feet 8½ inches. A counterbalance car runs on a track parallel with it with a gage of 3 feet. The accompanying engravings will give a good idea of the plan of the hoist. The main track, or passenger car track, is 400 feet long, while the counterbalance car track is but half this distance. The hoisting cable (plow steel pliable hemp center, 1 inch diameter) is securely fastened at one end into the rock bluff at the upper end of balance car track. The cable passes around a sheave 5 feet 6 inches diameter set horizontally on a vertical shaft in the center of the counterbalance car, then to the head of the tramway and around a sheave of the same diameter, and is finally attached to the passenger car. The weight of the passenger car is 7,500 pounds, and the weight of the counterbalance car double this, or 15,000 pounds. The load for the passenger car is sixteen people. The motive power consists of an old style street railway motor, Type F 30, Thomson-Houston make, rated at 15-horse-power. The overhead trolley is not reversible as the tramway is straight, without

curve. The motor is geared to the axle of the rear wheels of the car. The wheels are 24 inches in diameter. This axle is connected with the forward axle by sprocket wheels and chain. The propelling power is dependent entirely upon traction. It was feared that traction would not be sufficient under all conditions, to propel the car, in which case rack and pinion could be connected. This can be done at any time if the service requires it, but the winter months have passed and there seems to be no need of them, for thus far the tractive force has proved satisfactory, the wheels seldom slipping, even when starting under a full load.

As a guard against accident there are two friction clutch brakes. One acting automatically is connected



INCLINE—GREAT FALLS, MONT.

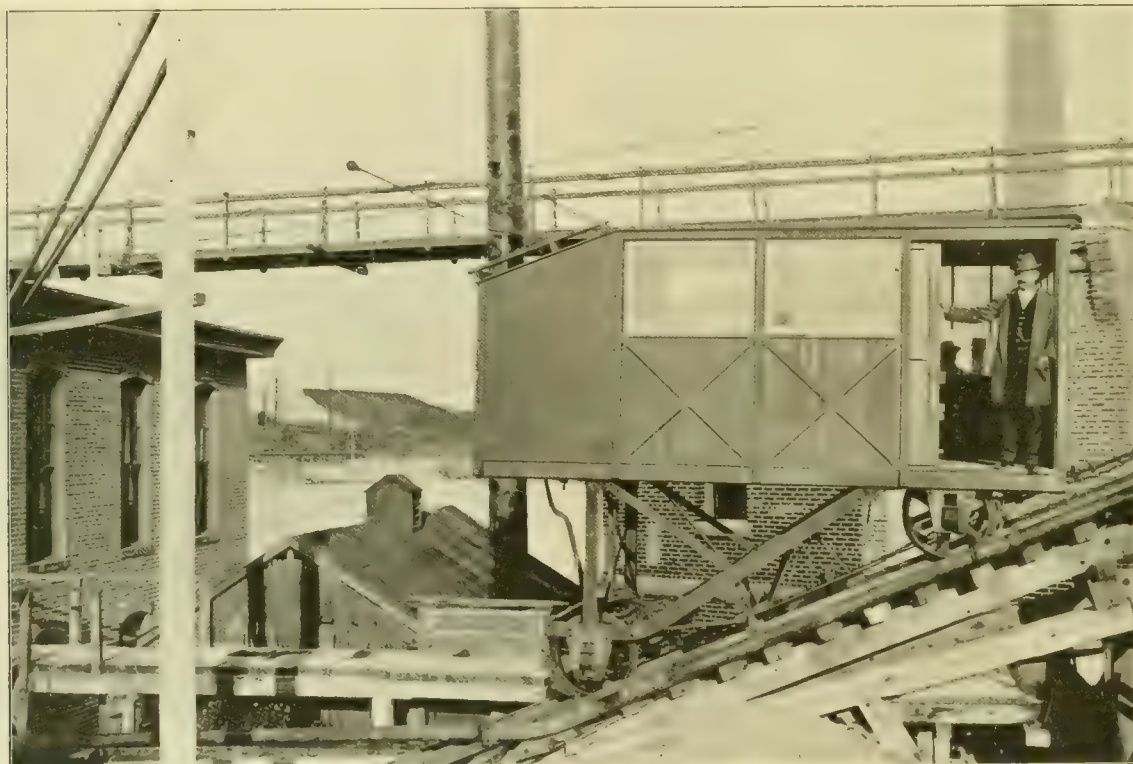
with the hoisting cable by a spring coil and in case of cable breaking will clutch an 8 by 8 inch timber guard rail, securely bolted to the ties on either side of which the clutch shoes are suspended. The second clutch brake is on the same plan and acts upon a second timber guard rail as above, not automatically but by windlass, to be applied by the motor man by hand in case of emergency. Besides the above mentioned brakes, there is the ordinary car wheel friction brake used in stopping the car at landing points. The car is easily handled, and starts and stops as easily as the best running building elevators,

without jar or jerk. This car is a great convenience to the patrons of the street railway and is fully appreciated by them. It is run in connection with the cars, making trips to connect with all outgoing and incoming cars. No extra fare is charged for trip on incline railway. The motorman, who is also conductor, sells single tickets at the regular fare, which entitle the holder to ride on the outgoing cars. From people descending no tickets are required. The enterprise is a very commendable one.

The incline hoisting car can make a round trip in two

CIGAR EXCHANGES.

The Boston Transcript is out of patience with the smoker who carries his lighted cigar into the car. "Such crimes as murder and robbery are highly reprehensible, it says, and cannot be mentioned except in terms of reprobation. What then can be said adequately to measure one's abhorrence of the double-dyed villian who brings into the passenger car a lighted cigar and allows it to smolder, to the discomfort and disgust of his fellow-



ELECTRIC INCLINE -- GREAT FALLS, MONTANA.

minutes, including discharging and receiving its load, and is thus capable of handling many passengers between times of departure of cars.

The Daniels Steel Railroad Tie Company, of Youngstown, O., is receiving many inquiries from electric and steam railway officials for samples of the Daniels steel tie. Large shipments are being made to new and former customers.

Edward P. Sharp, recently connected with the American Mica Company, Boston, is located at 44 Niagara street, Buffalo. He represents the Beacon Vacuum Pump & Electrical Company, Bradford, Kyle & Company, Taunton Locomotive Manufacturing Company, American Mica Company, Shawmut Fuse Wire Company, Spinney & Virtue, Sampson Cordage Company. He also handles the specialties of the R. D. Nuttall Co., and the Partridge Carbon Company carbons. Mr. Sharp has a host of friends who will be glad to see him succeed.

passengers? Surely hanging were a mild punishment for so atrocious a crime."

To do away with the practice of carrying cigar stubs, the New Orleans Picayune proposes the establishment of exchanges at terminals, and at different points along the route: Here is a description: "A man entering a car to go down town, will deposit his cigar stub with the switchman or starter, and receive a check for it; the check at the end of the line will be good for a cigar stub that has been left there by a man going up town."

On paper, this scheme seems feasible. But shall the gentleman who leaves a half-smoked 50-cent imported cigar be compelled to accept in exchange a "two-for-five" smoked to the end? Or, shall the switchman or starter be required to keep a dozen cigars lighted, when he has perhaps pledged himself not to indulge in the weed?

Vogan Bros., New Castle, Pa., have built a motor car, to be operated by the Connelly gas motor, which will be run experimentally in New York City.

GENEVA STREET RAILWAYS.

The first electric road in Geneva, Switzerland, was opened a short time ago. It is operated by the General Swiss Tramways Company, and the electrical work was done by the Industrial Electric Company, of Geneva. This company, which is an important one in railway work on the continent, was the one which installed the Mount Saleve incline railway, described in these columns previously, and many other electric railways for city traffic. The view of the factory of this company at Secheron, near Geneva, shows that as far as manufacturing facilities go, European electric railway builders are by no means behind American. The electric road at Geneva goes through the most thickly settled districts of the city. The main line is a single track with turnouts, extending $3\frac{1}{2}$ miles, from Champel on one side of the city to Petit-Saconnex on the other side. There is also a double track route about a mile long. The speed is $7\frac{1}{2}$ miles an hour in the city and $12\frac{1}{2}$ miles an hour in the suburbs. The maximum grade is only 5.5 per cent, although the line is very hilly. Cars run on a fifteen minute headway. The power is rented from the municipality, which controls the water power of the River Rhone at this point. From the power house an underground cable is run to the center of distribution of the system. There it branches into two cables which run along the line and tap into the trolley wire at intervals. Lightning arresters are put at all such taps. In the city the trolley wire is galvanized iron, of about No. 1, B. &

ductivity of the iron. Copper trolley wire is used outside the city. The trolley insulators are a mica composition. The cars are best described by a glance at the engraving.



STANDARD MOTOR CAR—GENEVA

ings. The most noticeable feature of the car equipment is the controller, which has the backward and forward lever motion that seems to be one of the favorite forms in Europe.

In addition to tramway systems proper, Geneva has an abundant supply of narrow gage steam roads that correspond very close to our interurban and suburban roads, that handle all kinds of traffic. A. Mallet recently gave a very full account of these lines before the Civil Engineers' Society, of France, from which this description is taken.



INTERURBAN TRAIN—GENEVA

S. gage, "in order to obtain a line that will stand any strain." This will be a novel idea to American electricians, and it is a question if any greater security is obtained with this kind of wire than would exist with hard drawn copper, to say nothing of the inferior con-

The canton of Geneva has a total area of 93 square miles, and contains 107,000 inhabitants, 70,000 of which are in the city of Geneva. The city and canton contain 19.4 miles of ordinary steam road, 9.7 miles of tramway proper, and 43.3 miles of narrow gage lines. It is thus

seen what an important part these narrow gage suburban roads play. The franchises for these lines were granted in 1886. There are now nine routes radiating from the

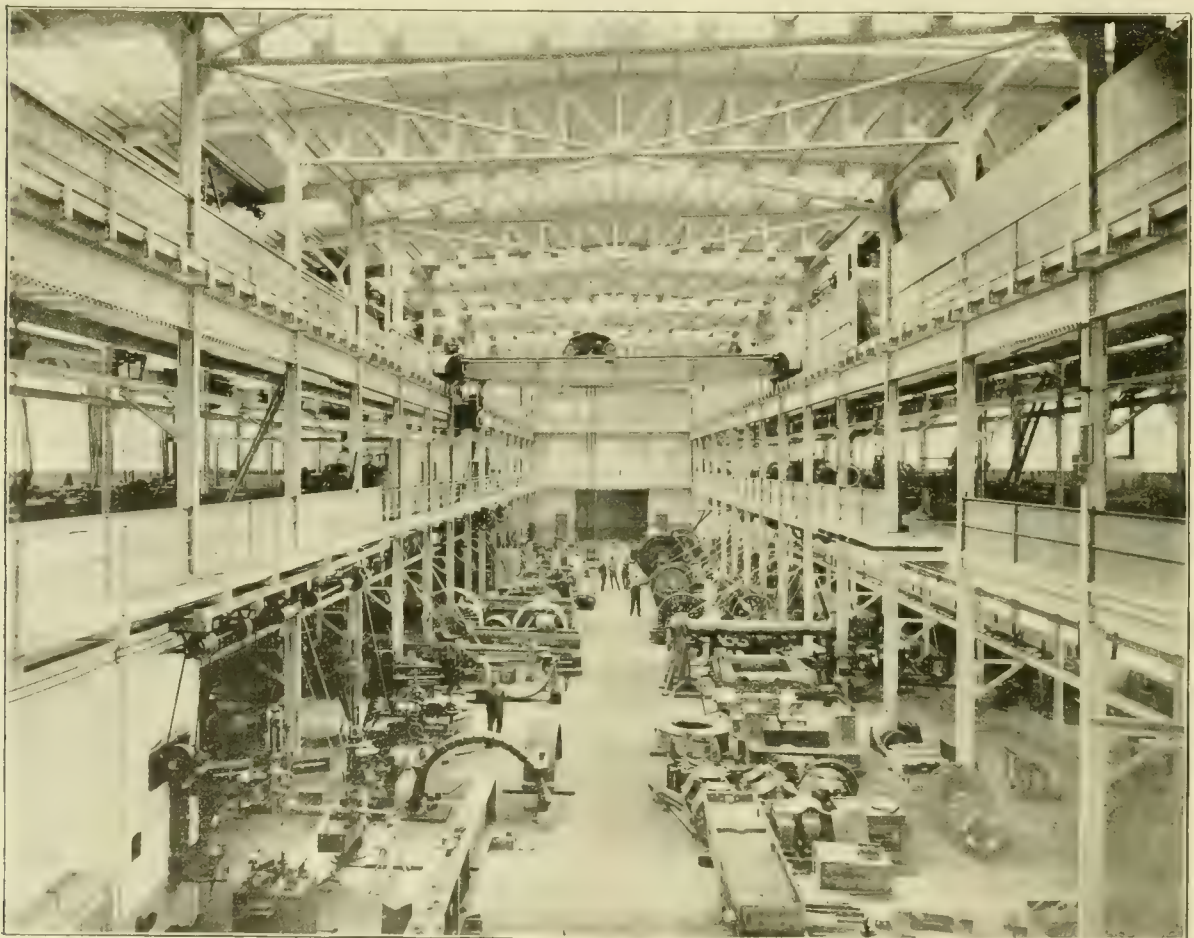


MOTOR CAR AND WAITING ROOM.

city. The permanent way of these lines is along the highways, wherever the grade is not too severe. When it is desired to avoid sharp corners or heavy grades, the railway leaves the highways altogether. The line is simply placed on the side of the road as in American interurban practice. The lines go through some of the crowded market streets of Geneva without a serious number of accidents. The maximum grades are 6 per cent. Independent locomotives are used, but they are housed in. Three or four light single truck cars are

hauled in a train. Some of these cars are combination baggage and passenger and the others are devoted exclusively to baggage or passenger traffic. The plan is to run on a headway of about an hour, with additional trains for rush hours. Traffic seems to be very good. The rates of fare are from 2½ to 3 cents per mile. The maximum speed is 16 miles an hour, but the average only 6 to 9 miles an hour. The operating expenses are 16 cents a train mile and 7 cents a car mile. The success of these suburban roads should be an encouragement to American investors in interurban electric roads. The engravings of one of the trains is reproduced from the *Railway World*, of London.

E. J. Hart, Sr., of New Orleans, La., passed away peacefully at the ripe old age of seventy-eight years. As early as 1846 he became identified with transportation, by establishing a line of steamers to ply between New Orleans and the Texas seaboard. As president of the Canal & Claiborne Railroad Company, New Orleans, he was universally liked by the employes. Mr. Hart would permit no abuse of horses, and the condition of the street railway live stock bore witness to his humanity. He was married in 1843 to Miss Juliana Leovy, who with five adult children survives him.



MACHINE SHOP INDUSTRIAL ELECTRIC COMPANY—GENEVA



An electric railway will be built between Mons and Boussu, Belgium.

In Cape Town, South Africa, the De Beers Company will construct a street railway to Kenilworth.

An electric tramway is to be built from Colwyn Bay to Llandudno, England, by way of Conway and Deganway.

Projected Japanese electric railway schemes are: one twenty miles long from Tokio to Yokohama, and one from Oita and Bepw.

The Glasgow tramway committee of the town council has declined a proposal submitted by a private firm to work several of the municipal lines by electricity.

The Liverpool, Eng., Overhead Railway Company has declared a dividend for the half year at the rate of 5 per cent per annum on preferred stock and 2 per cent on common stock.

The Barcelona, Spain, Street Railway Company, operating eighteen miles of track, is about to adopt electric traction, the officers having been at last convinced that it is cheaper than horses.

A Connelly motor has been running in Bermondsey Vestry, England. The ratepayers have protested against its operation on account of "the danger to foot passengers, annoyance to tradesmen, and the offensive smell from the oil tank."

A fine of \$2,000 has been placed on the Neath & District Tramways Company of Neath, Glamorganshire, Wales, for not keeping its permanent way in repair. A further penalty of \$5 per day will be exacted for each day's delay in effecting the repairs.

The City & South London Underground Electric Railway has succeeded in reducing its operating expenses during the last half year from 12.44 cents to 12 cents per train mile of three cars. The expenses are now 60.9 per cent of the gross receipts, as against 64.6 for the preceding half year.

The new trolley line, of the Dublin Southern District Tramways, between Haddington road, Dublin and Dalkey, is the first of its kind in Ireland. The line is eight miles long and nearly all double track. The permanent way consists of girder rails laid on six inches of concrete, and is paved with granite blocks.

The large Berlin Horse Tramcar Company has put three Tudor accumulator cars in service between Lichtenfeldt and Moabit. Every car has accommodation for 20 sitting and 11 standing passengers, and the weight of the car, without passengers, is close upon eight tons.

A wind storm at Bradford, Eng., overturned several street cars. For six hours traffic was entirely suspended, the manager preferring to keep the cars safe in the sheds. So great was the force of the gale that J. C. Chaplain, the manager, found it impossible to reach the overturned cars in a cab and was obliged to use a tramway engine.

Storage battery carriages still continue to appear (and disappear) in foreign cities. One equipped with Tommasi cells is now "running loose" around Paris. It will probably continue so to run until the money all "runs" out of its owner's pocket and it will sink out of sight to make room for the "next," which is sure to appear in the course of time.

At Gera and Zwickau, in Germany, an arrangement is in operation in the combined lighting and railway stations which permits the use of lighting dynamos on the railway load. Each engine drives two 250-volt dynamos. During the day these are connected in series on the railway circuit. At night they are put in parallel for lighting and charging storage batteries.

G. R. Cowdery, engineer of the New South Wales government tramways, has been experimenting with rail joints which make no allowance for contraction and expansion. In King street, Newtown, 510 feet were laid in November, 1893, and no ill effects were shown resulting from the winter and summer strains. The fish-plate bolts were 1 1/4 inch and made a driving fit. No space was left at rail ends.

Vienna, Austria, will be completely electrified when the plans of the municipality and the new tramway company are carried out. The latter has been experimenting with storage batteries and intends to discard horse power for electricity. The city government proposes to construct eleven radial lines of electric road with either overhead or conduit wires. These lines will connect with the belt line, and will run underground in the town and on the surface in the suburbs.

The overhead railway in Liverpool, Eng., has proved itself so great a convenience that the public is clamoring for its extension; and since the northern branch has, during its brief operation, returned such satisfactory profits, the shareholders have sanctioned an extension to Park road. The plans for the extension have been prepared by Sir Douglas Fox, assisted by J. H. Greathead, the engineer, and the work will be carried out by the company's engineer and manager, S. B. Cottrell. Leaving the main line near Herculaneum Dock Station the branch will strike off to a hill, through which it will pass

by means of a double arch tunnel, which is continued to the terminal station, the overhead thus becoming an underground railway.

The application of the London United Tramways Company for a trolley franchise along a fraction of a mile of Uxbridge-road in the city of London is creating quite a disturbance. Some of the objections urged are senseless in the extreme and reflect no credit on the



REBUILT HORSE CARS.

parties making them. One M. P. said, at a recent council meeting where the matter was being discussed, that wherever the trolley was introduced it decreased the value of property along the street. He certainly displayed a remarkable ignorance—in fact should be decorated with a leather medal for knowing nothing about what he is discussing. Aside from some objectors of this class, the people and property owners are expressing themselves as much in favor of the project, and there seems to be a good prospect that the permission will be obtained. It will be a great victory for the trolley if it can invade old and conservative London.

This is the way they do it in Calcutta according to Indian Engineering: "We quite indorse a contemporary's suggestion that it would greatly assist the proper working of tram cars and save the horses no end of useless labor if, instead of a car being stopped anywhere and at any time by anyone at his sweet will and pleasure, the drivers were directed to halt at definite stations numerous enough to give reasonable facilities to every user of tram cars to get in or out, and not to stop the cars at the pleasure of any passenger or passengers, the measure would give satisfaction to most of the passengers. It is not uncommon in the Calcutta tram cars to see it stopped half a dozen times within a length of a quarter mile, indeed some people take such advantage of the fact that a tram car may be stopped anywhere that they instruct a servant to hail a tram car and stop it, and then to run in and inform his master of the fact, who then in a leisurely way walks up and honors the tram with his 5 pice patronage! Each stoppage is a severe strain on the poor horses, and it is small wonder that in the hot weather the heat and the terrible oft-repeated strain wantonly and needlessly inflicted on the poor dumb animals kills them off—sometimes by what is called sunstroke—in a few moments, more generally in a few months of cruelly prolonged slow torture."

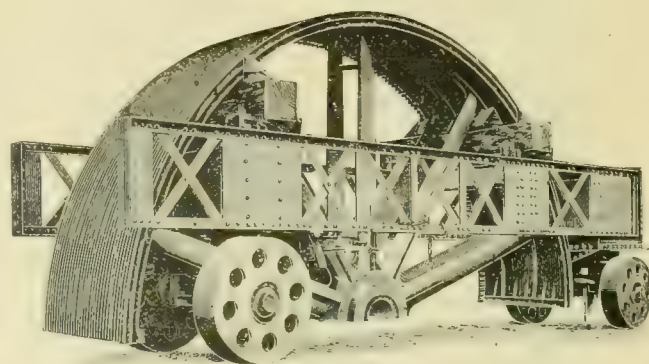
REBUILT HORSE CARS AT MEMPHIS.

F. G. Jones, the enterprising manager of the Citizens Street Railroad of Memphis, does not believe in wasting old material. The accompanying engraving shows a couple of cars which he has had built by the joining together of two horse cars. The work was done at the shops of the Memphis Car and Foundry Works. They are 28 feet long and mounted to be run as trailers. We

think all will agree that they are handsome specimens of car building, and a credit to Mr. Jones' enterprise and the skill of the Memphis Car & Foundry Works.

WILL CARRY 30 TONS.

Sixteen horses are required to haul the truck shown herewith, which is used for transporting large flywheels and other large pieces of machinery at Lille, France. The frame is composed of two lattice girders connected in the front by a box girder supported by the pivot or perch of the front wheels and braced by two I-beams placed at $\frac{1}{3}$ the length of the frame and by a solid vertical panel near the end. The length outside is 28 feet and the width outside is 7 feet 10 inches. The free space



TRUCK FOR FLY WHEELS

between sides is 6 feet 6 inches. The wheels are of iron, the front wheels being 3 feet 8 inches in diameter, weight 1.2 tons each, rear wheels being 4 feet 4 inches in diameter, weight 1.5 tons each. The axles are 7.9 inches square, the bearings 20 inches long and taper from 7 inches to 6 inches in diameter. The maximum designed load is 30 tons, or a 26 foot wheel. The wheel shown in the illustration, which is reproduced from Engineering, London, is 24 feet in diameter, 5 feet 9 inches broad and grooved for 30 ropes.



Interesting Bits of Information from all Parts of the Country,
Boiled Down for Busy Readers.

The summer convention of the Northwestern Electrical Association will be held during July in Chicago.

"An exclusive eternal franchise for an electric railroad" has been awarded by the municipality of Honolulu, Hawaii.

"Happy Man's Car" is the other name for a trailers in Indianapolis, Ind., since smoking has been permitted in them.

It is reported from an eastern road that high paving stones have worn holes through the motor pans on several cars.

Track laying has begun on the Manitou, Col., Electric Railway. William Frizzell, the contractor, has 50 men at work.

Forest City to Nanticoke, Pa., is the route of a 52-mile electric line, the connecting links of which will be finished this summer.

Bids for the construction of the Dexter & Brownville, N. Y., Street Railway, were opened March 24, but the contract was not awarded.

Work has begun on the construction of a trolley line between Nanticoke and Glen Lyon, Pa., for the People's Street Railway Company.

A golden spike, driven by Mrs. J. F. Spiger and Mrs. John F. Kitto finished the construction of the new Union Park street railway at Spokane, Wash.

The New York & New Haven Railroad Company will use 50-foot cars on the Nantasket Beach branch, equipped with air brakes and convertible into steam cars.

A reorganization of the Savannah, Ga., Electric Railway Company will be effected by Receivers Young and Collins. New 5 per cent bonds amounting to \$600,000 will be issued.

Four miles of the McKeesport and Glenwood extension of the Second Avenue Traction Company, Pittsburgh, Pa., will be constructed by Sanford & Brooks, of Baltimore, Md.

The General Electric Company sold fifteen double equipments, 50-horse-power G. E. 1,200 motors, one 500, and one 650-kilowatt generators to the Kansas City Railway Company.

Mail is now carried from Boston to Brighton, Mass., on the electric cars. The trolley car leaves Boston at the same time as the train which formerly carried the mail and reaches Brighton before the train.

Anderson, Ind., is the center of 100 miles of electric railway, now under construction and planned. The Hon. Charles Henry is at the head of the enterprise, which is known as the Gas Belt Electric Railway.

Our English friends, in speaking of earnings, say the "drawings" for the last month were so and so. We have heard of roads where the net receipts might not inappropriately be designated as "leavings."

It is hardly to be expected that in order to create business for a funeral car, a street railway company would start a graveyard. Such a rumor was started by a paper concerning one of the thriving New York interurban roads.

Lady (in a crowded street car)—"Thank you sir; but I don't like to deprive you of your comfortable seat." Irishman (who had risen to offer a seat)—"Be th' powers, ma'am, it was comfortable no longer when Oi saw you standin'.

An aerial suspended railway across the Niagara Falls is projected by the Aerial Tramway Company. Cables are to be stretched across the Niagara river from the American to the Canadian side. On these cables steel cages will travel.

Trolley parties promise to be even more popular around Philadelphia than they were last year. Philadelphia was the original home of the trolley party. The People's Traction Company is making special preparations for this class of business.

Conductors' deposits aggregating \$6,400 will be returned to them by the Consolidated Traction Company of Jersey City, N. J. The present management believes that the \$20 deposit fails to produce the desired results, and is chiefly a cause of bad feeling.

The Ft. Worth, Tex., Street Railway Company is rebuilding its cars, converting open into closed cars, and also constructing some entirely new cars. A number of Peckham trucks and G. E. 800 motors have been purchased for the new cars by Manager George Hendricks.

A sad accident at Jacksonville, Fla., emphasizes the necessity of care on the part of employes regarding the movement of cars around barns. George A. Bethel, an electrician, was under a car making repairs when someone started the car. A wheel passed over his leg and he was injured so that he died.

Preparations for the Cotton States exposition are being made by the Atlanta Consolidated Street Railway Company. Shops have been started by the company for the building of its own cars. Two or three terminal stations will be located within the exposition ground, and several lines will be operated from the center of the city direct to the grounds.

"What do you think of this idea of using the gas motor for rapid transit?"

"I don't believe Congress'll ever approve of it."

"Why not?"

"It's a sacrilege. The idea of running cars with speech material!"

Citizen—"What do you think of the view in front of my home?"

The Street Car Magnate—"Horrible! Horrible!"

Citizen—"What! Why, we regard this as one of the most beautiful residence avenues in Chicago."

The Street Car Magnate—"Nonsense!" Why, it hasn't even a horse car line."

Passenger—"Do you have any funny experiences on the front platform?"

Motorman—"Well, I guess so. Only the other day I hit a man who was trying to cross the track and threw him clear through a plate glass window. There was a policeman riding on the platform, and I thought he'd die a-laughing."

Subscriptions to the capital stock of the Milan, Birmingham & Elyria Electric Railway Company are being received at the bank of Milan, postoffice of Birmingham and savings bank of Elyria, O., to obtain funds for construction. H. D. Olds is president, F. Burk, secretary, and G. W. Clary, treasurer, of the company.

A friction brake somewhat similar to that used on the Blue Island avenue and Halsted street cable trains in Chicago, has been in use for some time on two cars of the Cicero & Proviso Electric Railway. The brake uses leather as a friction surface. The principal difficulty that has developed so far is, that it is inclined to take hold too strongly, even when the motorman is very careful.

O. C. Hyatt claimed a broken neck as the result of the collision of a buggy, in which he was riding, with a car of the Oakland, Cal., Railroad Company. He brought suit against the street car company for \$20,000 damages. Dr. Woolsey, an expert witness for defendant declared in court that no man could live after having received a fracture such as Hyatt claimed to have sustained. A verdict for \$500 was returned by the jury.

A free ride on the street cars is given every purchaser of a newspaper by some of the newsboys of San Francisco, to boom their sales. Persons getting off cars at transfer points frequently have transfer tickets in their possession which they had thoughtlessly accepted from the conductor. These tickets are begged by the boys or picked up on the street where thrown away, and given to buyers of the papers, who present them.

The system of interlocking crossing switches and signals, which has been in operation for a year and a half on the Chicago North Shore Electric Railway, and which was described in the REVIEW of December, 1893,

will be installed on all the grade crossings on the north side of Chicago as fast as the electric lines are installed. This device cuts out the trolley current and opens derailing switches as operated by interlocking levers in the gateman's tower.

"See that party?" said a Boston citizen, pointing to a shriveled and dried up specimen of humanity. "Well, he's the meanest man in the state." "Who is he?" He's a lawyer in one of the interior towns where they have bobtail street cars, and one day while he was riding up-town a lame man on the car gave him a dime and asked him to pay his fare. He did as requested and then wanted to keep the other nickel as a fee for professional services.

Two gentlemen, the other day, riding on the Walnut Hills cable line, Cincinnati, going to the city, were speaking of the constant jerking, and wondered what was the cause. As they passed near Effluent Pipe street, a large spool with a cable on it was being drawn by a number of horses up the hill, when one of the gentlemen turned to his friend, and said: "What is that?" The friend, with a smile, said: "I thought something was the matter. Why, they are taking up the slack."

A new trial will be had in the case of the Washington & Georgetown Railroad Company and the American Car Company, growing out of the failure of the latter to furnish 120 cable cars previous to the Grand Army encampment in the autumn of 1892, according to contract. The cars were to cost \$749 each, and the railroad withheld \$18,238 until the matter could be adjudicated. The court of appeals remanded the case because the judge in the lower court had improperly instructed the jury not to consider any damages due to delay.

The personal injury suit of Flossie Poole, against the Grand Rapids, Mich., Consolidated Street Railway Company, was recently decided in her favor. Her victory is a barren one, however, for the \$400 verdict will but suffice to pay the costs, which were assessed against her. Mrs. Poole injured her hip while getting off a car. While, admitting the injury, the company claimed she was guilty of contributory negligence, in getting off on the wrong side of the car, and letting her dress trail so that it was stepped on as she left the foot-board.

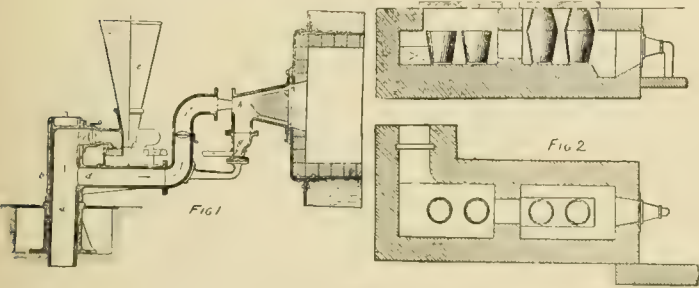
A crowded car was plunging along 43rd street, Chicago, with every seat filled, every inch of standing room occupied, and a good paying load on both platforms. A stop was made for another would be passenger who secured footing on the step and hung dangerously out from the grab handles.

"Step forward please" said the conductor, but they didn't step; they couldn't. Then in desperation the fare collector appealed to the platformers to enter, reinforcing the remark by "There's plenty of room inside the car; why, it's vacant!"

APPARATUS FOR BURNING COAL DUST.

Herr Friedeberg of Berlin, has invented an apparatus for burning fine coal, which is forced into a fire-box by a jet of air. The apparatus has been used in a boiler supplying a 12-horse-power engine, the amount of coal dust required being equivalent to 5 pounds per horse-power an hour. The Engineering and Mining Journal, from which the illustrations are taken, describes the device as follows:

Fig. 1 is a vertical section of the apparatus as designed for a stationary boiler. The basis of the system is the



WILL BURN COAL DUST.

air or blast tube *a* which is inserted in a casing *b*, to which are secured by bolts the air tubes *c* and *d*; the funnel *e*, supported by the casing or box *f*; the blast tube *g*, and finally the conical chamber *h* leading into the boiler. The case *f* is supported by the tube *d*, but has no connection with it. The tube *a* has two openings on the side, connecting respectively with the tubes *c* and *d*. These openings can be closed by giving the tube a rotary movement in the case *b*, which at once closes the passages. The blast tube *c* is divided into two branches which enter the box *f* in such a way that the air forced through them puts the powdered coal in motion and carries it through the passages, *i, i*, into the tube *g*. The larger fragments of coal which may be found in the powdered carbon fall to the bottom of pipe *g*, from which they can be removed by a small valve. The horizontal tube *d* opens into a vertical pipe which is carried by a bend into the conical chamber *h*. Both *c* and *d* are provided with valves by which the amount of air forced through them can be regulated. In operation the mixture of air and powdered coal is forced through the pipes *i, i* and *g* into the conical chamber *h*; there it meets the current of air forced through the pipe *d*, which drives the coal dust through the openings into the fire-box as indicated by the small arrows in the illustration.

Fig. 2 shows the apparatus arranged for crucible furnaces. The furnace is divided into two parts, into the first of which, the blast enters and the metal is melted, while in the other part the crucibles are placed in order to heat them before they are charged. Openings are made in the top of the furnace to permit the crucibles to be taken out and put in place without stopping the work. It is said that in a furnace 9 feet 10 inches long, 110 pounds of copper were melted in 45 minutes, including the time required for starting the

furnace. The amount of powdered coal used per pound of metal, was 0.38 pound, while under the old method in use at the same establishment about 2.2 pounds of coke were needed.

ORDINANCE TO PREVENT FLAT WHEELS.

Newark, N. J., people are determined to prevent the running of cars with flat wheels. An ordinance has been adopted by the board of street and water commissioners to that effect, providing a penalty of \$50 for each offence. Following is the ordinance:

Section 1. That no street railway car shall be used or operated upon the streets of the city of Newark, unless the machinery used thereon or in connection therewith, and the wheels and other equipment thereof, shall be in a safe and sound condition, and of such character as to make the least practicable noise in the running of such car.

Section 2. That no car shall be used or operated upon any of the streets of the city of Newark as a street railway car, the wheels of which shall be flattened either in one or more places, and all wheels shall be considered under the provisions of this ordinance flat or flattened wheels which in the ordinary operation of the car produce either noise or jar on account of such flattening.

Section 3. That it shall be the duty of the superintendent of works and the duty of the inspectors or other agents appointed by him, to make stated examinations of the wheels and machinery used upon the electric cars operated in the city of Newark, and to report the condition of said cars to the board of street and water commissioners, at their regular or other meetings.

Section 4. That any street railway company, its president, manager and officers, and each motorman and conductor, operating or causing to be operated, running or causing to be run, any street railway car with defective machinery or flattened wheels upon any of the streets of the city of Newark, shall be subject to a penalty of fifty dollars for each and every offence.

LIVING UP TO THE LAW'S LETTER.



Guard—Hey! youse can't sit dere.

Ephraim Podunk—Well, they's no room inside, an' that sign on the door says ye can't stand here, an' I'll be jiggered ef I lie down.—Cincinnati Enquirer.

Tramp—"Mister, I'm a loaferin' vagabond, an' I'm not askin' you to waste any good money on me, but—"

Impatient Citizen—"Well, what is it you want?"

Tramp—"But if you've got any Canadian 10-cent pieces you can pass 'em on me, mister. I'm no street car conductor."

Street Railway Review

REPORT OF PERSONAL INJURY TO EMPLOYEES, PASSENGERS OR OTHER PERSONS.

INSTRUCTIONS.—A separate blank must be filled out for each person injured, whether the injury is severe or slight, by each employe present. Every question must be answered fully. If blank spaces are insufficient for full statements, answer further in form of letter and attach hereto

- 1 Name, residence (street and number) and P. O. address of person injured.
- 2 Age, Occupation, Nationality.
- 3 A Married or single? If married, name and residence of wife or husband.
B Names and ages of children.
C If single, names and addresses of father, mother, and nearest relatives.
- 4 A Employee, passenger, or neither? If employee, how long in service of this Company, and in what capacity?
Date last entered this Company's service.
B If passenger, where from and destination.
C If unknown, give full description (height, weight, hair, eyes, marks and clothing), and state what articles found on person.
D Circumstances in life? Accident or life insurance? (State names of Insurance Co's.)
- 5 State fully the nature and extent of injuries, and prospect of recovery.
- 6 A What was done with and for the person? By whose direction?
B If not sent to hospital, why not?
C Name and address of surgical attendant?
D If dead, state disposition of remains. Attach copy of verdict of Coroner's Jury if inquest held.
- 7 A Date, hour, day or night, and exact point where accident occurred?
B If at night, was it very dark? Weather?
C Did accident occur at or near a public or private crossing? (If near crossing, state distance and direction from.)
D On main or side track? Curve or straight track? (State whether curve to right or left.) Grade.
- 8 A Train No., Conductor, Yardmaster or Foreman.
B Engine No., Engineer, Fireman.
C Baggage-man, Head Brakeman, Rear Brakeman or Porter.
D Switchmen.
E Other employes.
F No. cars in train, No. loads, No. cars with air brakes.
G Speed of engine or cars at time of accident, If train late how much?
- 9 State your location with reference to point of accident, and what were you doing?
- 10 What was injured person doing at time accident occurred?
- 11 Give full particulars of cause of accident. **[7 LINES]**
- 12 A If person was injured while coupling or uncoupling, was he using coupling stick? Was all coupling apparatus in good order?
B State kinds of draw bars. Were draw heads of equal height?
- 13 Give initials and numbers of engines and cars immediately connected with this injury, and condition of same. If in bad order, were they so marked?
- 14 A Was there any imperfection or defect in track, bridges, building, rolling-stock, machinery, tools, or other appliances that caused, or may have assisted in causing, the injury, and if so, state in what way and to what extent?
B If there was any defect, how long had same existed, and had same been reported, and if so, when, by whom, and to whom?
C Did injured person know of defect?
- 15 State what precautions were taken, and by whom, to prevent the accident.
- 16 In your opinion, what further precaution could have been taken?
- 17 Who was in charge of the engine, and was it properly handled? Who was in charge of the train, or cars, at time of accident?
- 18 A What signals or warnings were given, and by whom, and in what way?
B Were signals or warnings acted upon; if not, why?
- 19 Was whistle sounded? Was bell rung? (State when and where with reference to the accident, the whistle was sounded and bell rung; and was bell rung continuously?)
- 20 What distance did engine, or cars, run after accident occurred?

21. What does injured person say as to extent of his injuries?
22. What does injured person say was cause of accident?
23. In your opinion, was any employe at fault? If so, who, and in what way?
24. In your opinion, was injured person at fault? If so, in what way?
25. Was any one at fault, and if so, whom?
26. Name, occupation, postoffice address and residence of every person who witnessed the accident or can give any information regarding it (Attach hereto the written statements of such persons, signed by each):

NAME.	OCCUPATION.	RESIDENCE AND P. O. (Give Street Number)
27. REMARKS. State fully any further information you can.

(Sign here)

Month, Day of month,

(Occupation)

(Dated) 189

(Address)

When practicable, make a rough sketch or diagram below, showing location of Tracks, Cars, or other objects connected with accident:

NORTH

WEST

EAST

SOUTH

EXPLANATION:

BLANKS FOR ACCIDENT REPORTS.

With the hope that it may contain suggestions of value to claim departments, the REVIEW prints herewith a form of blank for accident reports.

This form has been adopted by the Association of Railway Claim Agents, and is a sort of composite form made up from the blanks used by many steam roads. There are of course features that can be only applied to steam roads, but most of them will be found of value in street railway practice.

The illustrations represent the front and back of the form. The reverse has been condensed by cutting out some of the lines that follow the questions, in order to save space, the latter are given in full. It will be seen that they are very comprehensive, and cover every point it is desired to know about an accident. It is important to every claim department to have a testimony record of some kind, the more complete the better.

The REVIEW desires to secure copies of the forms used by every street railway in this country and will be grateful to claim agents who will send us copies of their forms.

J. L. Hall, of Springfield, Mass., has been appointed superintendent of the Hartford, Manchester & Rockville, Conn., Electric Railway.

LUXURIOUS CAR FOR DIRECTORS.

An elegant private car for the Fair Haven & Westville Railroad Company, of New Haven, Conn., has just been shipped from the car building shops of the Jackson & Sharp Company at Wilmington, Del.

The car is of the ordinary size, with vestibuled platforms. Its exterior is painted in royal blue, striped with sky blue and gold. The panels are as hard and smooth as glass, reflecting the light like a mirror. Gold is used in the elaborate lettering and ornamentation. Brightly polished brass forms the outside metal work, showing against the blue ground like gold. The windows are large single panes of plate glass inclosed in mahogany sash; the glass of the doors and enclosures of the platforms is beveled and ornamented with lines of fret work; and the lights are of colored leaded glass of a soft golden color. The equipment consists of two 25-horse-power motors, air brakes, electric lamps and bells. The whole is mounted on the standard motor truck, made by the Bemis Car Box Company, of Springfield, Mass.

More beautiful than the exterior is the interior, with its color scheme of blue and gold. The wood work is of golden-hued mahogany, paneled and carved; the stanchions supporting the roof are delicately turned columns, and the cornice over the windows is molded in exquisite designs. From this cornice on each side, drop curtains

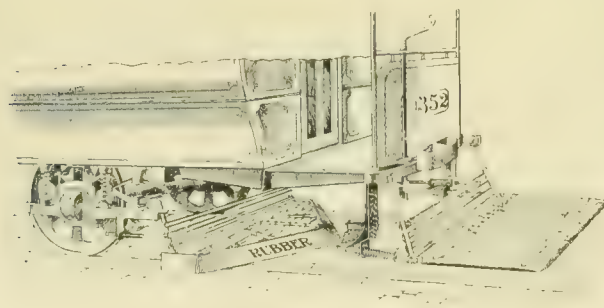
trimmed with silken fringe, cord and tassels, hang as graceful drapery between the big plates of clear glass. The roof linings are of sky blue inclosed in dull yellow borders and ornamented with flowers painted in natural colors and arranged in conventional festoons, scrolls and wreaths. The blue ground work of these roof linings is broken by an overlay of gray clouds, making the blue color appear like that of the sky seen through the festoons and wreaths of flowers. There are three clusters of electric lights, one five and two three-light clusters, encased in oxidized silver, the metal forming the leaves and stems of lillies and the incandescent bulbs appearing like the golden-hearted flower protruding from the blue sky.

The furnishing of this car is unique; the floor is covered with a royal Wilton carpet that lies under the sky colored roof like a patch of moss. The seats are willow and cane chairs richly upholstered in bright colored plush. There are a dozen of these chairs and no two of them are alike; and yet they all appear to belong in the same group and to have been especially designed for this car.

CRAWFORD'S NEW AUTOMATIC FENDER.

The fender which is illustrated in the accompanying engraving is said to possess the merits of lightness, strength and durability. It was designed for special service by R. C. Crawford, whose fenders are so well and favorably known to street railway men.

The frame of the new fender is made of angle iron, and the two ends are bent up. To the ends are riveted light steel channel bars, forming the back screen. The horizontal screen is also of steel, being composed of strips



NEW CRAWFORD FENDER

1 inch wide and $\frac{3}{16}$ inch thick, riveted together and to the frame in front. A broad strip of rubber covers the toe. The whole frame is suspended from the truck on the Crawford patent method by means of vertical and horizontal rods. These rods, being actuated by springs, give a flexible support to the fender, which is very desirable in an apparatus required to sustain shocks. It can be set to run within an inch of the rails or any height above them.

When a movable object is struck the fender will be pressed close down to the track preventing the object from getting under the wheels. When a fixed obstruction is encountered the fender will move upward and pass

over the object, such movement being permitted by the spring actuated vertical rod. By moving a pin the tension of these springs can be increased or diminished as may be required. The adjustment holds in the horizontal rod admit of carrying the fender far forward or close up to the wheels. The fender can be folded up off the track when desired. Besides the one here described many other styles of fender are made by the R. C. Crawford Manufacturing Company, of Pittsburg, Pa.

DEATH BY ELECTRICITY.

That the true cause of death by the electric current is due to dynamic apoplexy has been demonstrated satisfactorily by Dr. J. Mount Bleyer. A report of the doctor's discovery is given in the *Electrical Review*. When Professor D'Arsonval, of Paris, showed that victims of electric shock could be brought to life by inducing artificial respiration, scientific men jumped to the conclusion that death resulted from the stoppage of respiration, or, in other words, suffocation. Dr. Bleyer shows, however, that the stoppage of respiration is only one of the two principal effects of electric shock, and that when apoplexy has also supervened it is useless to attempt resuscitation by artificial respiration.

The illustrations given herewith are micro-photographs of brain sections of David Hampton, who was executed by electricity at Sing Sing, N. Y., January 28, 1895, show lesions caused by the current. A post mortem examination of Hampton's body was made by Dr. Aug. Goelet, who says:

"The body was placed on the table for examination. The superficial veins of the extremities, especially those of the arms, were empty and collapsed. Incision of the scalp and through the skin of the chest-wall showed that all, or nearly all, of the blood in the body had been driven into the head and upper part of the chest and neck, and that rupture of the over-distended vessels had allowed extravasation of blood to take place into the cellular tissues of the scalp and under the skin covering the upper part of the chest, especially near the neck. Here the extravasated blood appeared to be congealed. In marked contrast with the condition of affairs in this location, incision through the abdominal wall showed the tissues to be almost bloodless. Incision into the tissues under the location of the leg electrode showed the same bloodless condition.

"On removal of the skull-cap and puncture of the membrane lining the interior of the skull and enclosing the brain, a great quantity of dark blood escaped, showing that there had been an extravasation into the cranial cavity. This was found to be due to the rupture of the blood vessels. This blood coagulated, but not firmly. A specimen preserved remained fluid and unchanged for days, except that the color became brighter. It was estimated that at least two quarts escaped from the scalp and cranium in removing the brain. On removing the dura mater the vessels on the surface of the brain were seen to be distended and there was evidence of rupture

in many places. The same condition prevailed throughout its interior, and congealed blood was found at the base of the brain, a condition incompatible with either consciousness or life.

"On opening the chest cavity the lungs appeared normal, but extravasation of blood had taken place into the lung tissues at the upper part. The heart walls were thin and flabby; the blood retained in the cavity was dark.

"On opening the abdominal cavity, the vessels of the intestines, especially those of the small intestines, were distended with blood. The liver was normal, but engorged with blood. The kidneys and spleen were normal. The abdominal aorta was empty."

Artificial respiration should be tried, however, in every case of accidental shock, for there is a chance that life is still in the body. When a person is to be executed great care is taken to have every detail scientifically exact, and enough current is given to cause death. In accidents no such pains are taken nor calculations made that if worked out will kill, but the probability is that the effect will be only temporary, if intelligent attempts are made to counteract it. Everybody about an electric plant should be instructed in some good method of inducing artificial respiration.

REPAIRING ARMATURE SHAFT BOXES OF MOTORS.

G. W. Calkins, of the electric railway, West Bay City, Mich., writes us he has been troubled a great deal with the wearing out of the boxes of the armature shaft on gear end of motors. "After running about a year these became badly worn, needing rebabbiting and boring out. We had a number of boxes, also, that were cracked and broken. They are made of cast iron with wrought iron rings in the end. The cast iron being only a quarter of an inch in thickness was too light and would not stand. To remedy this trouble I have used three inch gas pipe with number 12 thread couplings, the latter of which I have cut into rings for the ends and drilled two holes on each side to hold the babbit in the pipe. With the rings screwed on each end very tight, cut with a lathe and turned true it makes a very strong box, that will not break. We have quite a number running with good results. This is a device of my own invention on which there is no patent. It is used on the Bay City Consolidated street railway. I have found it quite serviceable, reliable and a considerable saving in the repair bill and if the above description is not sufficiently plain I will cheerfully give any further information required about the boxes to any electric road wishing it. I have, also, a new style of trolley pin which works to a charm, saving repairs and causing no trouble. If any electric road would like a description of this I will be pleased to give it on receipt of request."

J. H. Mellinger has been appointed acting superintendent of the York, Pa., Street Railway Company.

THE HARDIE COMPRESSED AIR MOTOR.

Robert Hardie, chief engineer of the Rome, N. Y., Locomotive Works, has completed his new street car motor, a trial trip of which was recently made. Mr. Hardie is one of the best informed experts on compressed air in the country and predicts the general use of air on both surface and elevated lines. Pending the conclusion of some patent matters, full details of the mechanism are not given out.

The car started out with 1,800 pounds of air pressure to the square inch and a temperature of 310 degrees on its hot water tank, which is used to great advantage in heating the air before it passes at reduced pressure to the engine cylinders. A valve constructed for the purpose reduces the pressure of the stored air to 140 or 150 pounds, and this is the working pressure, or the pressure



HARDIE COMPRESSED AIR MOTOR.

at which the air enters the engine cylinders. The motor starts gently, runs smoothly at a rapid rate and stops by air brake without jerk or jar. It was run back and forth repeatedly for upwards of forty trips and the test showed that under the conditions applied the motor would run twelve miles from one charging of compressed air, and make seventy stops. In the afternoon a trial was made without warming the compressed air—the hot water from the tank being drawn off entirely. This test showed that the motor can be operated with cold air, but that the warmed air will exert nearly double the force yielded by the cold air, and consequently carry the motor nearly double the distance.

The method of recharging the storage cylinders with compressed air is a very simple operation and, with the flexible couplings contemplated for the purpose, the recharging of a car with power need not occupy more than a minute or two. The same is true as to recharging with hot water and the two can be done at the same time. The temperature of the hot water tank, covered with asbestos, on the occasion of the trial, was reduced from 310 to about 200 degrees in one working hour. Under more favorable conditions, especially in summer, this reduction would be probably not more than half as much.

A company is being organized in Rome for the manufacture and introduction of the Hardie system.

UP THE JUNGFRAU.

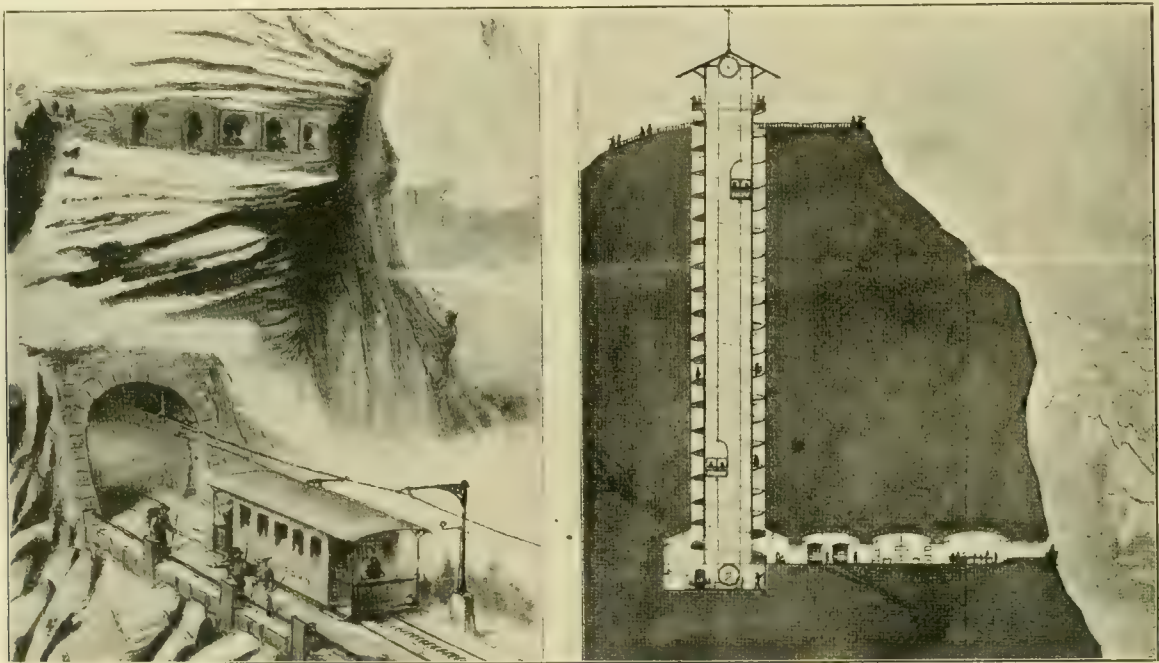
Had the same conditions of transportation existed then as now, Napoleon Bonaparte and his army would have won no fame for their campaign in the Alps. Instead of being conquerors of cold, exposure and fatigue by means of physical endurance, they to-day would overcome these three strong forces with the aid of car bodies and heaters. One of the most interesting of these mountain roads is that which starts from Scheidegg traversing the interior of the heights of Eiger, Monch and Jungfrau. Daylight is reached by an elevator system rising 216 feet through the cone of Jungfrau.

This road which is more than 8 miles long, is operated by electric traction. The gradient varies from 1 to 26 per cent, and the line reaches a height 6,890 feet. Exclu-

LETTER MAILING PLAN ABANDONED.

Dublin postal authorities have tried the experiment of placing mail boxes on the street cars for the accommodation of persons who cared to mail letters. Although considerable money was used and efforts made to induce the people to patronize it, after 19 months the service was abandoned as there was not enough encouragement to warrant its continuance. The postmaster general expected to extend the service on all the street railway lines of the city. Each car running in and out of town on the Donnybrook line was provided with a box to receive letters, the same as regular letter boxes. Collections were made by a carrier at the down town terminus of the line.

As the people did not seem to take kindly to the ser-



UP THE JUNGFRAU.

sive of the starting point there are six stations bored into the solid rock. Paths lead from the stations so that passengers may readily ascend by the mountain on foot, if they do not care to continue by the easier method of being hauled. Each station is fitted with a dining room and bed-rooms, the latter about the size of a steamship cabin. They are lighted with electricity.

Instead of continuing to the top of the mountain by rail, passengers are transferred to an elevator, which is built inside a circular iron tube that was sunk into a hole blasted in the rock. The elevator is operated by a dynamo which is driven by hydraulic power from lake Luchinen in the Lauterbrunnen. There is also a winding staircase within the tube to accommodate those who do not care to attempt the elevator. The illustrations show a car entering a tunnel, and a footpath by the railway. A station overlooking a glacier is represented. The right hand illustration shows the terminal with restaurant, and the elevator.

vice, the Tramway Company suggested that it be transferred to the Rathmines line which passes through a more populous section than the other line. The transfer was made April 16, 1894, and the service succeeded better, but there was nothing to show that the people really cared for the service. Some days several letters were posted in the cars while on others there was scarcely any. The service was maintained every day from 11 a. m. to 6 p. m. at considerable expense. The section it was sought to accommodate is fairly well supplied with letter boxes, in some localities they being only 600 feet apart.

The Rice & Sargent Engine Company, of Providence, R. I., has sold a 300-horse-power tandem compound engine to the Pembroke Mills, Suncook, N. H.; a 200-horse-power engine to the Lawrence Lumber Company, Lawrence, Mass., and a 75-horse-power engine to the Oakdale Manufacturing Company, Providence, R. I.

STREET RAILWAY LAW.

EDITED BY FRANK HUMBOLDT CLARK, ATTORNEY AT LAW, CHICAGO.

Duty to Look and Listen before Crossing Track of Electric Railway.

Where a person about to cross an electric street railway track on foot looks only in one direction for a car, and is struck by a car which he could have seen coming from the opposite direction if he had looked, he is guilty of contributory negligence.

The Court said: "While pedestrians have the right to be upon and travel along the public highway, yet they are bound to take notice of the dangers incident to the public travel thereon, and especially is this so where street cars are constantly passing and repassing, driven with electricity. The city authorities recognized the necessity of rapid transit, and limited the cars upon the street to 15 miles per hour. These cars are heavy, laden with motors, and they cannot at once be stopped. They have no right to run down pedestrians, but those in charge have a right to suppose that pedestrians will not walk onto the track without looking to see if a car is coming. It is well known that these crossings are places of danger, and that cars do not stop at every crossing. Here the custom was to stop on the opposite crossing from where the plaintiff was. Plaintiff had lived in that vicinity for many years, and knew of the constant going and coming of these cars, and he was bound to know that the crossing was a place of danger. He was bound to look both ways before getting on the track. It will not do to say that he acted prudently and carefully in looking before getting off the curb, and was therefore not bound to look again, because he saw no car coming from the north at that time. A car running 15 miles an hour would pass a great distance while a pedestrian was going 13 feet 10 inches. The plaintiff was bound to look before stepping upon the place of danger.

"In *Gardner v. Railroad Co.*, 97 Mich. 240, it was held that a traveler was guilty of negligence in not looking in the proper direction for an approaching train, by which he was injured. It appeared in that case that when within 5 feet of the track, if he had looked, his view would have been unobstructed for 250 feet in the direction from which the train approached. In *Haight v. Railroad Co.*, 7 Lans. 11, a woman on foot approached the defendant's tracks on Bridge street, in the village of Amsterdam. This street crossed three tracks at right angles. Her attention was fixed upon a train passing over the third track. She passed over the first track in the rear of some freight cars. Here she looked up the second track, but, on account of the freight cars, could not see very far. Then, in passing over the seven feet between the first and second tracks she looked at the rear end of the train which had just passed over the third track, but did not look along the second track after she left the rails of the first, and, reaching the second, she was struck by a train on that. It appeared that in the seven feet between the first and second tracks she could have seen the approaching train for several hundred

feet. She did not once look down that track, but kept her eyes upon the train upon the third track. This was held to be contributory negligence as matter of law. The Supreme Court said: 'It is therefore quite plain that if the plaintiff had looked in the right direction as she was about leaving the first track, she must have seen the approaching train. There was no obstruction in the way, and that she did not see or hear the train which was coming when she stepped on the track was owing to the fact that she did not look in the direction from which it came. * * * She neglected to look in the right direction.' This case was cited with approval by the Court of Appeals in *Salter v. Railroad Co.*, 75 N. Y. 279. It is said by counsel for plaintiff that, while this may be the rule in regard to steam railways, it cannot be applied to street railways. In *Carson v. Railroad Co.*, (Pa. Sup.) 23 Atl. 369, it was held that failure to look for approaching cars on the part of one about to drive across the tracks of an electric street railway company is such contributory negligence as will prevent his recovery for injuries received by colliding with a car. The Court said: "If, by looking, the plaintiff could have seen, and so avoided an approaching train, and this appears from his own evidence, he may properly be non-suited." In *Ward v. Railway Co.*, (Sup.) 17 N. Y. Supp. 427, it appeared that plaintiff's intestate was fatally injured while attempting to drive across a street railway track. There was evidence that at any time before reaching the track, deceased, by a glance, could have informed himself of the approach of the car, but that he drove onto the track without looking in either direction. It was held that he was guilty of contributory negligence. In *Creamer v. Railway Co.*, 156 Mass. 320, the supreme court of that state held that where a person stepped from a horse car at the junction of two streets, and immediately started to cross the track of an electric road, without looking or listening, and was run over by the electric car running at the rate of 15 miles an hour, there could be no recovery, because the deceased was not exercising due care.

"We see no more reason for applying the rule that one must look and listen before crossing the tracks of a steam railway than that one must look and listen before crossing a street car track upon which the motive power is electricity or the cable. In this state it is well settled that persons passing over railroad crossings must exercise care. They must look and listen, and under certain circumstances, must stop, before attempting the crossing. Electric street car crossings are also places of danger. The cars are run at great speed on this street in question. The city ordinance permits it, and the rule must be that, before going upon such tracks, every person is bound to look and listen. If the view is unobstructed, and the pedestrian takes this precaution, there is not much opportunity for him to be injured. It will not do to say that

he has discharged his responsibility in case of an accident, by looking when some feet away, for he may miscalculate the distance, and the speed of the car. To avoid danger, he must look just before he enters upon the track. This was the rule laid down by this court in *Houghton v. Railroad Co.* (Mich.) 58 N. W. 314. The uncontradicted evidence shows that the car was lighted with five electric lights inside, and carried the signal lights required by the ordinance. Others saw these lights, and it does not seem to be disputed that, had the plaintiff looked just before going upon the track, he would have seen the car.

(Supreme Court of Michigan, *McGee v. Consolidated Street R. Co.*, 60 N. W. Rep., 293.)

Where one had alighted from another car, it was held that failure to look before crossing the track was not contributory negligence. (*Omaha Street R. Co. v. Lothneisen*, 58, North Western Reporter, 535. See also *Boerth v. West Side R. Co.*, 58, North Western Reporter, 376).—ED.

Starting Car before Passenger is Seated—Injury to Passenger—Duty of Company.

"We are strenuously urged with able and ingenious argument to enunciate in this case a new rule of law based upon the imperative demand of the public for rapid transit. If, we are told, street cars are not to start until passengers are seated, it is manifest that much more time than is now occupied will be consumed in going to and fro in the city. We have no doubt of this. We recognize the wish of the public and the effort of defendant to satisfy it. Nevertheless the rule remains that common carriers, while not insurers of safety, are, so far as human care and foresight can go, in ways consistent with the nature of the business to be done, to provide for the safety of passengers: (*Hutchison on Carriers*, Sec. 498.)

"If, then, it is asked, the starting of a car before the passenger has reached the seat is necessary in order to reach destinations at the time demanded and promised, must the company respond in damages to one who, by such starting, is thrown down and injured? Not if human care and foresight could not have prevented such injury, it may be answered. But has the defendant established in this case that by no human prudence it could have saved the plaintiff from falling? Is it not reasonable to believe that if the defendant has placed in its car a servant whose sole duty it was to assist passengers to seats and to keep them from falling until seated, the accident now under consideration would have been avoided? Whether these or any other means for safety were practicable is not for us to say; it is sufficient for the purposes of this case that appellant has not shown that it did all that consistency with its business, human foresight and care could have done to insure plaintiff's safety."

(Appellate Court of Illinois; *West Chicago Street Railway Co. v. Craig*, 27, Chicago Legal News, 218.)

Buggy on Car Track—Duty to Stop Cable Car—Question for Jury.

Whether a cable car was run closer to a buggy on the track than was prudent, and whether there was negligence in failing to stop it to allow the buggy to leave the track, is a question for the jury.

Whether a person driving on a street car track could have left it more expeditiously than he did and by so doing have avoided an injury received from the car is a question for the jury.

It is not necessarily negligent for a cable car to follow after a buggy which is seen upon the track, when running slowly enough so that it can be stopped in time to avoid a collision.

(Supreme Court of Missouri; *Hicks v. Citizens R. Co.*, 25, Lawyers' Reports annotated, 508.)

Collision of Street Car and Steam Car—Injury to Passenger on Street Car.

A street car company is liable for an injury to a passenger on one of its cars who is not guilty of any negligence, caused by a collision with a steam railroad train, where it was the duty of its servants to go forward upon the tracks of the railroad company at a crossing, to a position where they could ascertain whether or not the cars of the railroad company were approaching the crossing, and they failed to do so.

(Appellate Court of Illinois. *West Chicago Street Railway Co. v. Martin*, 47 Illinois Appellate Court Reports 610.)

Conditions in Street Railway Ordinance—Right of City to Repeal.

A city has the legal right and authority to impose such terms and conditions as it deems best for the interest of the public, under the express provisions of Ill. Act July 1, 1874, chap. 66, § 3, upon permitting a street railroad to be laid in its streets.

A city which passes an ordinance granting to a street railway company the right to use its streets for railway purposes upon conditions affecting the operation of the road after its proper construction, and requiring it to keep the streets and tracks in proper repair, cannot reserve the legal right to repeal such ordinance on the failure of the company to comply with such conditions, on its own adjudication, without applying to the courts.

(Appellate Court of Illinois. *Citizens Horse Railway Co. v. Belleville*, 47 Illinois Appellate Court Reports 388.)

Failure to Provide Seat—Duty to Passenger Riding on Step—Sudden Starting of Car.

The employees of a street car company are bound to exercise greater care where a passenger is forced to ride upon the step because he cannot find a seat in the car.

A passenger on a street car is not guilty of negligence in riding upon the step because he cannot find a seat.

It is negligent to start a street car suddenly and without warning when a passenger is upon the step and before he has time to get his seat in the car.

(Brooklyn City Court. *Kinkade v. Atlantic Avenue Railway Co.*, 29 New York. Supplement 747.)

T. G. Bensley has been promoted to the position of superintendent of the Buffalo, Kenmore & Tonawanda Electric Railway Company.

THE "BLUE GRASS" OF THE SOUTH COVINGTON & CINCINNATI STREET RAILWAY.

For the exclusive use of trolley parties, the South Covington & Cincinnati Street Railway Company, of Covington, Ky., has purchased a special car, which far exceeds in luxurious appointments the handsome cars usually set aside for these parties. Appropriately the car has been named "Blue Grass," and no other lettering appears on it except the words "special car."

In place of the usual windows in the ends of the car, the outside space is filled with solid wood panels, and the inside with four oval beveled glass mirrors, extending from ceiling to floor. These form a perspective that adds much to the appearance of the interior, and suggests the thought—where does the car end? The outside of the car is painted black, decorated in gold and silver. On the side panels are the words, "Blue Grass," in gold, tastefully embellished. The exterior, with its rich ornamentation, is an agreeable introduction to the sumptuous finish of the inside. Our engravings show views of interior and exterior.

The interior exposed wood work is selected cherry, finished in its natural color. Side windows of single lights of polished plate, etched in consistent design, extend from within a foot of the floor to the roof. The shades, mounted on spring rollers, are of silk tapestry, showing a pink design on a pale green ground, and are partially concealed by double hanging curtains of heavy, rich velour, of a water-green color, suspended from a

which will hold them in any position. On the floor is a Wilton carpet of the highest grade, olive shade, with a small figure which harmonizes well with the other details. Ten rattan chairs and four divans of special design, richly upholstered in corduroy, contribute to the comfort of the occupants.

Included in the equipment are electric heaters, call bells and lights, of which latter there are nine concealed



COSILY SPECIAL CAR.

in three oval globes of opalescent glass set in bronze filligree frames. The metal trimmings, inside and out, are of solid bronze of special design. The car body is mounted on a Brownell No. 2 motor truck, with 7½-foot wheel-base, equipped with 25-horse-power motors, made by the Westinghouse Electric & Manufacturing Company, and No. 3 sand boxes, furnished by the Baltimore Sand Box Company. The Blue Grass is one of the finest examples of the car builder's art, and does great credit to its designers, the Brownell Car Company, of St. Louis, Mo.

SPEED ON CURVES.

H. M. Lane, of the Lane & Bodley Company, Cincinnati, sends us the following concerning speed of street railway trains on curves:

"EDITOR REVIEW: I have read with interest your editorial on page 199 of the issue of April 15th, 1895, calling attention to the matter of street railway curves for the longer cars, and higher speed met with in modern practice.

"I believe I was the first to operate cable cars at full speed on curves, (1884) and realized at the time the importance of the points to which you call attention in your editorial, and as a result of the consideration of the matter, designed the arrangement as shown by the enclosed patent specification and drawing. This design was used on the entire cable system of Denver, as it existed up to the year 1889, and also on the Providence Cable Tramway, in the same year. This device enabled cars on the Denver Tramway to be turned completely around on the balloon curve in the street, at the full speed of 12 miles per hour, and absolutely without shock or jar to passengers or car, upon entering or leaving the curve.

"There is one feature of these curves which forms no part of the patent, which is very important, namely, a spiral 16 feet in length, introduced between that portion



LUXURIOUS INTERIOR.

bronze rod, and draped to side pillars. Each side pillar is surmounted by a bronze cap, supporting the curtain rods and cornice of the ceiling, forming a finish of unusual beauty.

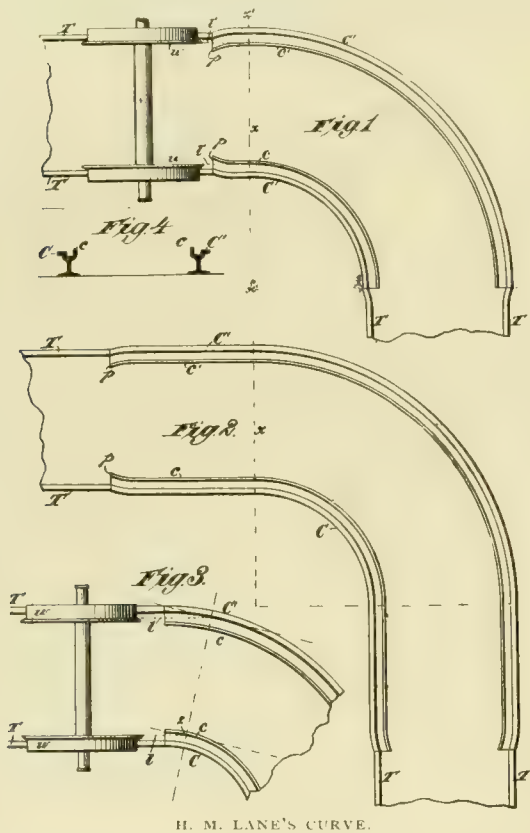
The ceiling is enameled white, with an ornate gilt border. The ventilator sash are filled with polished plate glass, beveled, and etched with a chaste empire design. They are provided with automatic fixtures

of the straight track provided with the guard rail, and the circular curve.

"The Johnson Company purchased this patent from me in 1889, seemingly for the purpose of pigeon holing it, although I believe they did make some objection to its practical use, owing to variations of wheel gage. I believe that the modern full groove girder rail requires that wheels shall be kept closer to gage than is required by this curve.

"At the present time it makes but little difference to me whether the Johnson Company prefers to hide their purchase, or to use it, but I think the public and the street railways should have the benefit of it."

Figs. 1 and 2 represent a street railway curve according to Mr. Lane's invention; Fig. 3, the common method, and Fig. 4, a cross-section of the track as in the plane

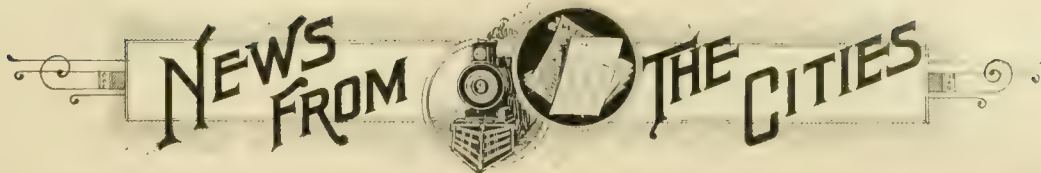


x'x' of Fig. 1. It is premised that the structure of street railway cars involves a rigid wheel base with wheels rigidly attached to the axles, and that track rails on curves have an inner guard, standing slightly higher than the rail proper. The rails T T in Fig. 3 merge into the curve C C at the radius line x, the curve being as a matter of practice somewhat wider in gage than the straight track. As the rigid wheel base is nominally capable of motion only in a straight line, the fore wheels w w traverse the dotted lines l l, until the flange of wheel w impinges against the guard c of the inner rail of the curve at z, where the angle of deflection as indicated by the dotted line, is relatively great. Obviously, this subjects the rails to excessive and destructive wear at the point z.

Mr. Lane's invention is designed to obviate the difficulty of wear of rail and lurching of cars by the construction and arrangement of the rails upon the curve and in relation to the straight track, wherein the guard rail section, which may begin and terminate at the junction of the tangent line and the curve, and include only the curve section, or may extend somewhat beyond and include part of the tangent at either or both ends of the curve—is widened in definite relations to the wheel flanges, so as to take the bearing of the inner sides of the wheel flanges upon the guards, and thus control the car in close relations to the track at the beginning and throughout the deflection of its course from a straight line. The preferable manner of accomplishing this is to bend the rails C C each, with a short horizontal inward curve at the junction with the straight tracks T T, as shown—enough to bring the impinging inside of the guards C C in line with dotted paths l l of the inside of the wheel flanges w w in each case—allowing slightly for proper play and variation in gage of wheels. The bending of the guard rails also gives a guiding flare p, to insure the proper entrance of the wheel flanges into the curve and a proper gage for abutting sections of straight and curved tracks. The deflection of the car by the curved rails is effected by the impingement of the flanges of the fore wheel w against the guard c, of the inside curve, and the impingement of the opposite rear wheel against the guard c' of the outside curve. The straight tracks T T are brought to the tangent points on the radius x at proper and close gage. In practice, the guard rails c c' are extended a short distance into the straight track as shown in Fig. 2, sufficiently to accommodate, approximately, the wheel base of the car and bring the wheel flange in proper relations with the guards before beginning the deflection. At the outgoing terminus of the curve the junction terminals T T may be bent in the opposite direction, as shown, so as to set these rails inward to the normal gage, or the guard rails C' may be extended to a short section of straight track to carry the car beyond centrifugal influence and leave it under control of its own normal tendency to go forward in the proper straight line of the subsequent track section. This construction is shown by the dotted line in Fig. 1.

A. S. Petrie, special auditor of the Pittsburg & Birmingham Passenger Railway Company, of Pittsburg, Pa., has been promoted by election to the office of secretary and treasurer.

M. T. Davidson, of New York, is building what will be the largest jet condenser and air pump in the United States for the new steel works of the Johnson Company at Lorain, O. The pumps are arranged to run either singly or duplex. The size of steam cylinders is 16 and 30 inches, of pump cylinder 36 inches, with a common stroke of 24 inches. The condenser for the two pumps is 12 feet in diameter and 9 feet 6 inches high. Mr. Davidson will move May 1 from 77 to 133 Liberty street.



Alabama.

BIRMINGHAM, ALA.—Varnell T. Brown has purchased the lease of the North Birmingham dummy line and will repair the line and rolling stock.

BRIDGEPORT, ALA.—C. B. Funck, of Lebanon, Pa., has received the contract to build an electric road between Pittsburg, Tenn., and Bridgeport, Ala.

ANNISTON, ALA.—Howard W. Sexton wants 2 first-class second-hand trucks for use with G. E. W. P., 30 motors, one 16-foot closed car, and two open car bodies, which may also be second-hand, if in good condition.

Arkansas.

LITTLE ROCK, ARK.—Henry C. Hartwick bid in the City Electric Railway and Capital Street Railway Company, for \$682,000.

California.

SANTA BARBARA, CAL.—The board of supervisors will receive bids for an electric road franchise.

SANTA MONICA, CAL.—A Boynton bicycle road will be built to San Bernardino via Los Angeles and Pasadena.

SAN FRANCISCO, CAL.—It is reported that the Market Street Railroad Company will electrically equip all its horse lines.

SAN JOSE, CAL.—John W. Eisenhirth has applied for an electric railway franchise to Saratoga, Santa Clara, Los Galos and Palo Alto.

LOS ANGELES, CAL.—The Los Angeles and Santa Monica Electric Railroad Company has been incorporated with \$50,000 capital by C. B. Van Avery, V. H. Raleigh, J. J. O'Brien, A. W. Eames, James P. Montgomery. The road will be twenty miles long.

FRESNO, CAL.—The San Joaquin Electric Company has been formed by J. J. Seymour, John S. Eastwood, O. J. Woodward, James Parteous, L. L. Cary, Harry Sherwood, and M. R. Madary, all of Fresno, directors. A dam, 80 feet high, will be built to obtain power for street railways and lighting.

SANTA BARBARA, CAL.—The Santa Barbara Consolidated Electric Company will build eight miles of road and is in the market for 30-pound steel rail, and all necessary construction material and equipment, and six cars. Poles and ties will be secured on the coast. Proposals should be figured f.o.b. Los Angeles, or common points.

Canada

QUEBEC, QUE.—The Quebec Street Railway Company has applied for permission to use storage battery.

NEW WESTMINSTER, B. C.—The Westminster & Vancouver Electric Tramway Company has been sold to the Consolidated Railway & Light Company, Vancouver.

WINDSOR, ONT.—Col. John Atkinson, E. W. Voigt, James Randall, Detroit; William McGregor, M. P., Windsor, and others have incorporated an electric railway company with \$100,000 capital.

ST. JOHN, N. B.—Sir William Van Horne is authority for the statement that the gas and street railway companies will be consolidated with \$500,000 capital as the St. John Railway Company.

OTTAWA, ONT.—It is reported that application will be made at the next session of parliament for the incorporation of the International Radial Railway Company to construct and operate an extensive system of electric railways.

TORONTO, ONT.—The Toronto, Hamilton & Niagara Falls Electric Railway Company has been incorporated by John Flett, H. H. Dewart, A. R. Lewis, Peter Ryan, E. A. C. Pew, Thomas Horne, S. C. Biggs and Dr. J. T. Silmour, Toronto.

Chicago.

CHICAGO.—William Ziegler, New York, has applied for a receiver for the Lake Street Elevated Railroad.

CHICAGO.—The council committee has recommended the passage of the Chicago Passenger Traction Company ordinance for 18 miles of electric road.

CHICAGO.—A stockholders meeting of the Metropolitan West Side Elevated Railway Company will be held July 6, to increase the capital stock from \$15,000,000 to \$30,000,000.

CHICAGO.—The Big Four Electric Company has been incorporated with \$200,000 capital, to manufacture electrical apparatus by W. H. Brown, L. K. Gillson, Henry G. Ames.

CHICAGO.—Directors of the Alley L have notified the stockholders that unless they took prompt action, foreclosure proceedings would be begun and the entire capital stock, \$7,500,000, wiped out.

CHICAGO.—The Metropolitan Electric Street Railway Company has been incorporated with \$5,000,000 capital, to operate in Cook, DuPage, Kane, Lake and Will counties, by Robert P. Parker, Richard E. Breed, James F. Dagley.

CHICAGO.—It is reported that the Chicago & Worth Electric Street Railway Company, incorporated some time ago with \$2,000,000 capital, has secured 28 miles of right of way. It has applied for a franchise.

Connecticut.

BRISTOL, CONN.—It is reported that the Bristol Electric Light Company and the Bristol & Plainville Tramway Company will be consolidated.

STAMFORD, CONN.—Gen. E. S. Greeley says he has purchased the Stamford Street Railroad Company for himself, and not for the New York, New Haven & Hartford Railroad Company, and will electrically equip it.

Colorado.

BOULDER, COL.—The Inter-Mountain Railway Company has been incorporated with \$300,000 capital by S. C. Brown, Eugene Austin, James Cowie, J. S. Switzer, George F. Fonda.

Delaware.

HARRINGTON, DEL.—The Harrington, Frederica & Denton Railway Company has applied for a charter to build an electric road. Capital, \$350,000; incorporators, Robert W. Reynolds, Ezekiel Fleming, Hezekiah Harrington and B. L. Lewis.

District of Columbia.

WASHINGTON, D. C.—The Alexandria & Mt. Vernon Electric Railway Company will construct its line.

Florida.

LONGWOOD, FLA.—E. W. Hencke, C. E., has charge of construction of the proposed electric road.

JACKSONVILLE, FLA.—The Jacksonville & Tampa Bay Railway Company incorporated with \$2,000,000 capital by C. C. Thompson, Martin Dodge and T. S. Appleyard, has applied for a franchise for 50 miles of electric road to Tampa, via. Palatka, Sanford and Kissimmee.

TAMPA, FLA.—The Consumers' Electric Light & Street Railway Company wants to put in a water power station seven miles from the city, one 700-kilowatt machine, one-half of the output to be used for incandescent lights, primary current 2,000 volts, and the other half for the railway, a direct current of 500 volts. The company desires to give in part payment its present equipment, one General Electric direct current generator, 500 volts, 360 amperes, one General Electric 1,000 light incandescent machine, 2,310 volts, 27 amperes.

Georgia.

BRUNSWICK, GA.—W. A. Jeter has asked for an electric railway franchise.

ATLANTA, GA.—R. D. Fisher, Elias Harman and F. J. Stone, have applied for an electric railway franchise.

SAVANNAH, GA.—Col. John Screven has been appointed receiver for the City & Suburban Railroad Company.

ATHENS, GA.—The Athens Street Railway Company has acquired water power and will move its power house.

COLUMBUS, GA.—Grigsby E. Thomas, Jr., is endeavoring to organize a company to build an electric line to Atlanta.

ATLANTA, GA.—Parteous & Wilkins, of New York, have contracted with the exposition management to build an intramural railway.

BRUNSWICK, GA.—The St. Simons Transit Company has been organized with \$20,000 capital, with A. H. Lane, president; W. F. Parker, secretary and treasurer; V. Dart, superintendent.

BRUNSWICK, GA.—Col. J. E. Du Bignon bought the Brunswick Street Railway Company and St. Simon's boat and car lines at sheriff's sale, for \$5,000. As soon as the sale is confirmed, an electric line will be constructed in Brunswick and a dummy line on St. Simon's island.

ATLANTA, GA.—The property of the Atlanta Traction Company in the possession of receivers W. C. Hale and E. B. Rosser, was sold May 7, together with the Atlanta City Street Railroad, which it controls.

Illinois.

LA SALLE, ILL.—The City Electric Railway Company has been granted permission to lay T rails.

MOLINE, ILL.—Petitions are being circulated for an electric line to Rock river and the Hennepin canal.

PEORIA, ILL.—The franchise of the Peoria Heights Street Railway Company has been extended a year.

PEORIA, ILL.—The Fort Clark Horse Railway Company has been bought for \$275,000, by John S. Stevens, representing bondholders.

RUSHVILLE, ILL.—C. W. Wainman, who is interested in a proposed electric road to Mt. Sterling, is reported to be making progress with stock subscriptions.

PEORIA, ILL.—The City & Prospect Heights Street Railway Company has been incorporated with \$150,000 capital by C. E. Woodbridge, W. S. Turner, John C. White.

BELLVILLE, ILL.—The Bellville Electric Railway Company has been transferred to Col. Casimer Andel, as trustee for parties who advanced money to aid in construction.

FREEPORT, ILL.—The Freeport General Electric Company has been incorporated with \$125,000 capital by William O. Johnson, Newton P. R. Hatch and Charles S. Hatch.

DANVILLE, ILL.—W. S. Mathias has been granted a franchise for 30 miles of electric road, which will pass through Bismarck, Rossville and Hoopeston, with a branch to Alvan.

WAUKEGAN, ILL.—The Bluff City Electric Railway Company has secured its franchise and will build 2½ miles to South Waukegan. Homer Cook, 50 Borden block, Chicago, is president.

AURORA, ILL.—D. A. Belden, general manager of the Aurora Street Railway Company, confirms the report of the consolidation of the Aurora and Elgin street railways, as the Carpentersville, Elgin & Aurora Railway Company, with \$1,200,000 capital. A new line will be built between the two cities, touching South Elgin, St. Charles, Geneva, Batavia, and North Aurora, and extensions will be made from Elgin to Dundee and Carpentersville. Work is to begin as soon as preliminaries and details have been arranged.

Indiana.

ELWOOD, IND.—The Elwood Electric Railway Company may extend its line a mile and a half.

WASHINGTON, IND.—The Washington Street Railway Company will be changed to an electric line.

WABASH, IND.—James Lynn has applied for an electric railway franchise. He represents Worcester, Mass., capitalists.

INDIANAPOLIS, IND.—The Indianapolis and Broad Ripple Rapid Transit Company has given a second mortgage of \$400,000 on all its property.

NEW ALBANY, IND.—It is reported that the Pennsylvania Railway Company will adopt electric traction on its line to Louisville and Jeffersonville.

HOBART, IND.—The Hobart & Western Electric Railway Company has been incorporated with \$50,000 capital by Alfred Morrison, Andrew J. Smith and George Stocker.

SOUTH BEND, IND.—Judgment on the foreclosure of the mortgage against the South Bend & Mishawaka Electric Railway Company has been entered in favor of the Central Trust Company, New York.

ANDERSON, IND.—It is reported that the Clodfelter Gas Belt Electric Railway Company has let contracts for the section from Anderson to Marion. N. J. Clodfelter is general manager, J. H. Winslow, Fairmont, treasurer; J. T. Sullivan, Summitville, secretary.

FT. WAYNE, IND.—Perry A. Randall is organizing a company to build an electric line to Blue lake near Churubusco, a distance of 15½ miles. Construction, it is said, will begin very soon, with 60-pound rails. The equipment will be 10 motor cars of 50-horse-power and 20 trailer cars.

Iowa.

OTTUMWA, IA.—The Ottumwa Railway, Electric & Steam Company contemplates a half mile extension.

BURLINGTON, IA.—Walsh Brothers, who own the Burlington Electric Railway Company and the Electric Light Company, will extend the lines. C. H. Walsh has succeeded C. D. Jones as superintendent.

SIoux CITY, IA.—The Corn Exchange bank has sued the Sioux City Street Railway Company and Frank Peavey for \$35,000. It claims that several years ago Peavey and other officials of the company issued fraudulent stock and induced the bank to loan \$35,000 on it.

Louisiana.

NEW ORLEANS, LA.—The Hudson Street Railway Company ordinance has been adopted.

NEW ORLEANS, LA.—The Canal & Claiborne Railroad Company is considering a change to electric traction.

LAKE CHARLES, LA.—The Lake Charles Electric Railway Company has opened offices and expects to begin construction this season.

Long Island.

PORT WASHINGTON, L. I.—Edward T. Allen has applied for an electric road franchise to Roslyn and Great Neck.

Maine.

THOMASTON, ME.—The Rockland, Thomaston & Camden Street Railway Company contemplates an extension at the Thomaston end.

BALDWIN, ME.—The Ossipee Valley Railroad Company will build an electric line through Baldwin, Cornish, Parsonfield, Hiram and Porter.

SKOWHEGAN, ME.—The Somerset Traction Company has employed E. E. Greenwood, of Madison, to survey the route of its proposed electric line to Madison.

AUBURN, ME.—F. W. Dana, H. W. True and N. Q. Pope are taking stock subscriptions for 7 miles of electric road from East Auburn to Turner, to connect with the Lewiston & Auburn Horse Railway Company.

Maryland.

BALTIMORE, MD.—The Washington & Baltimore Boulevard Electric Line has secured its franchise and will construct 32 miles of road.

BALTIMORE, MD.—Edward C. Burkhardt and Joseph A. Oaks, Buffalo, have bought 286 acres, which they will sub-divide and improve. They will build an electric road.

BALTIMORE, MD.—N. P. Bond, vice-president of the Baltimore, Chesapeake and Atlantic Railway Company, is interested in a proposed electric road at Ocean Beach, Md.

BALTIMORE, MD.—L. Roberts Coates, contractor, has filed a bill for a receiver for the Baltimore, Middle River & Sparrow's Point Railway Company. The chief engineer's estimates showed that Mr. Coates was entitled to \$13,180.50, while he claimed \$21,012.80. The sum of \$10,000 was paid, but the company refused to pay the balance of the \$15,000 unless a receipt in full was given, which Mr. Coates declined to do.

Massachusetts.

FALL RIVER, MASS.—The Globe Street Railway Company will extend its lines.

NORTH ADAMS, MASS.—The Hoosac Valley Street Railway Company wants to extend its line to Williamstown and Clarksburg.

BROCKTON, MASS.—The Brockton Street Railway Company has been petitioned to extend its electric line to North Easton.

BROCKTON, MASS.—The Brockton Street Railway Company has applied for a franchise to extend its line to North Easton.

BRAINTREE, MASS.—The Braintree & Holbrook Street Railway has been attached for failure to meet a note for \$2,100 held by the Quincy & Boston Street Railway Company.

VINEYARD HAVEN, MASS.—Francis J. Hartshorn and other directors of the Vineyard Haven Street Railway Company have petitioned for the right to construct a street railway.

HAVERHILL, MASS.—It is reported that the Haverhill & Amesbury Electric Railway Company has been purchased by the Lowell, Lawrence & Haverhill Street Railway Company.

COTTAGE CITY, MASS.—The Cottage City Street Railway Company has been sold to the Quincy & Boston Street Railway Company. Electric traction will be adopted. E. G. Eldridge is superintendent.

ATTLEBORO, MASS.—Work on the Interstate and the Attleboro, North Attleboro & Wrentham Electric Railways will be pushed. A. H. Watkins, of Farmer's Village, has been appointed superintendent of construction.

Mexico.

MEXICO CITY, MEX.—The scheme to electrify the street railways of this city has been abandoned.

Michigan.

DETROIT, MICH.—The two street railways will probably build a bridge to Belle Isle.

MARINE CITY, MICH.—Frank S. Parker has been granted a franchise to build an electric road to Detroit.

KALAMAZOO, MICH.—The council committee has recommended that the Citizens' Street Railway extend its lines.

PORT HURON, MICH.—The City Electric Railway Company is in the market for second hand iron poles, 18-foot cars, and 45 pound T rails.

GRAND HAVEN, MICH.—The council has granted a franchise for a dummy line, which must be operated by electricity within three years.

DETROIT, MICH.—The Detroit, St. Clair River & Port Huron Electric Railway Company has been granted a franchise by the council of Algonac.

DETROIT, MICH.—The bill authorizing the use of the Citizens' Street Railway Company's tracks by the Detroit Railway, has been defeated in the house.

DETROIT, MICH.—T. W. Palmer, W. Howie Muir and J. W. Simcock, have applied for an electric road franchise from the city hall to Log Cabin park.

SAGINAW, MICH.—The Saginaw & Bay City Rapid Transit Company has accepted its franchise and by its terms must have its road completed within three months.

PONTIAC, MICH.—Commodore Mills, George H. Barber, Detroit; T. A. Smith and W. G. Himan have been granted an electric road franchise. Surveys are being made by John McLaughlin.

NILES, MICH.—The Interstate Power Company has elected these officers: Fred E. Lee, president; R. D. Dix, Berrien Springs, vice-president; J. O. Beecraft, Dowagiac, secretary and treasurer.

SAGINAW, MICH.—The Inter-Urban Electric Railway Company has organized with Isaac Bearinger, president; John M. Nichol, vice-president; Frank E. Snow, secretary and treasurer. Material has been ordered.

Minnesota.

MINNEAPOLIS, MINN.—Charles Gibson, of St. Louis, Minn., contemplates building an electric railway at Lake Minnetonka. He is a large owner of real estate at the lake.

Mississippi.

ENTERPRISE, MISS.—S. H. Gelheman, Springfield Ill., and L. B. Bradley have secured an electric railroad and light franchise.

PASS CHRISTIAN, MISS.—The Pass Christian, Handsboro and Biloxi Electric Railway Company has been organized with L. B. Moseley, president; W. L. Dinkins, vice-president; C. Phelps, treasurer.

Missouri.

ST. LOUIS, MO.—The Connecting Electric Railway Company has applied for a franchise.

ST. LOUIS, MO.—The Kirkwood Electric Railway Company will increase its capital to \$300,000.

ST. LOUIS, MO.—The St. Louis & Jefferson Barracks Railroad Company has accepted its franchise.

CARTHAGE, MO.—The Jasper County Electric Company has bought the Carthage Horse Railway Company.

ST. LOUIS, MO.—The Clayton & Delmar Avenue Electric Railway Company has been granted a franchise. Construction will soon begin.

ST. JOSEPH, Mo.—The Central Trust Company, New York, has applied for a receiver for the St. Joseph Lighting & Traction Company.

SPRINGFIELD, Mo.—The Metropolitan Electric Street Railway Company was sold for \$100,000, to representatives of the reorganization committee.

ST. LOUIS, Mo.—An electric freight railroad costing \$30,000 is planned by Calvin M. Burnes, Charles G. Stifel, John Maguire, Edward Wolff, A. Jacobs and J. Denny.

ST. LOUIS, Mo.—The Clayton & Forest Park Railroad Company was sold at sheriff's sale to W. H. Swift, of the Fruin-Bambrick Construction Company which had a claim of \$30,000.

CARROLLTON, Mo.—The Carrollton dummy line has been sold under execution to J. M. Wilcoxson, for \$6,300, and he will convert it into an electric railway with capital furnished by Senator Smith, of New Jersey.

ST. LOUIS, Mo.—The St. Louis, Kirkwood & Meramec Electric Railroad Company has accepted its franchise, and will be connected with the Manchester Road Electric Railway. The latter will be known as a branch of the Scullin blue line.

Nebraska.

BEATRICE, NEB.—The Beatrice Rapid Transit & Power Company will be sold by the receiver in July. All claims for material, etc., are preferred.

New Hampshire.

MANCHESTER, N. H.—Beginning July 1, the Manchester Electric Light Company will supply current to the Manchester Street Railway Company. Additional machinery is required.

New Jersey.

PERTH, AMBOY, N. J.—It is reported that the Lehigh Valley Railroad Company will equip several branches for electric traction, beginning here with four miles

EAST ORANGE, N. J.—Five buildings of the Croker-Wheeler Electrical Supply Company, at Ampere, were burned, with a loss of \$100,000; insurance, \$40,000. Two buildings were saved. Considerable finished work was also destroyed.

RED BANK, N. J.—The Atlantic Highlands, Red Bank & Long Branch Electric Railway Company has been incorporated with \$500,000 capital, of which \$25,000 is paid in. The stockholders are David S. Arnott, Silas Dutcher, W. H. Hazard, S. S. Whitehouse, Benjamin Frick, Brooklyn; A. T. Allen, Hoboken; William T. Parker, Little Silver; William T. Corlies, Charles B. Parsons, Arthur A. Patterson, Red Bank, and James Steen, of Eatontown.

MT. HOLLY, N. J.—The electrical equipment of the Pennsylvania line to Burlington will be a Westinghouse engine and generator 300-horse-power each, Climax boiler. The Jackson & Sharp Company is building three combination passenger and baggage cars 43 feet long. Two will be equipped with two 75-horse power Westinghouse motors each and the third four Westinghouse motors of 50-horse-power each. The track will be laid with 70-pound rails. It is expected to develop a speed of 60 miles an hour.

POINT PLEASANT, N. J.—The South Jersey Street Railway Company is in the market for the following: Fifty-five straight line trolley wire hangers, $\frac{3}{8}$ -inch stud; 30 single curve hangers, $\frac{3}{8}$ -inch stud; 100 strain insulators; 85 trolley wire ears and 5 trolley splicing ears, grooved and tinned, to fit $\frac{3}{8}$ -inch stud; 6 trolley frogs, right and left hand; 4,000 feet $\frac{1}{8}$ -inch 7 strand galvanized steel wire; 3,500 feet No. 0 B & S. gage H. D. trolley wire; 1 ratchet track drill; 1 flat car for light freight, short wheel base or double truck, to be used as trailer; 1 32-inch wheel flat car, 8 to 10 feet long, single truck, short wheel base. T. P. Turner is superintendent.

New York.

AUBURN, N. Y.—The Auburn City Railway Company will extend its lines.

ROME, N. Y.—The Rome City Railway Company will equip its line for electric traction.

TROY, N. Y.—The Troy City Railway Company will adopt electric traction on its Cohoes branch.

KINGSTON, N. Y.—The Rondout & Eddyville Railway Company has applied for a franchise for 3 miles of electric road.

PORT CHESTER, N. Y.—The New York, Westchester & Connecticut Traction Company has filed an extension of its route.

OGDENSBURG, N. Y.—The Ogdensburg Street Railway Company has increased its capital to \$150,000, and will make extensions.

NEW YORK, N. Y.—It is reported that Roswell P. Flower is making heavy purchases of Long Island Traction Company stock.

KINGSTON, N. Y.—The Rondout & Eddyville Railway Company has been incorporated with \$30,000 capital, to build three miles of road.

OGDENSBURG, N. Y.—The Ogdensburg Street Railway Company is being reorganized with \$150,000 capital and will equip with electricity.

STATEN ISLAND, N. Y.—The railroad commissioners have permitted the Staten Island & Midland Railway Company to change to electric traction.

BROOKLYN, N. Y.—Justice Cullen, of the supreme court, has appointed S. L. Haight, receiver for the Rockaway Village Street Railway Company.

NEW YORK, N. Y.—It is reported that the McMillan syndicate has secured an option on the Second Avenue Railway stock and intends to "cable" the road.

HERKIMER, N. Y.—The Herkimer, Mohawk, Ilion & Frankfort Street Railway Company will increase its capital to \$150,000 for the purpose of electrical equipment.

NEW YORK, N. Y.—The Enholm Conduit Company has been incorporated, with \$5,000,000 capital, \$500 paid in, by O. A. Enholm, C. E. Sherin, New York, and G. S. Smith.

NEW YORK, N. Y.—It is reported that the Metropolitan Traction Company has purchased the Fulton street cross town line owned by the North & East River Railway Company.

BUFFALO, N. Y.—The Buffalo & Gardenville Electric Railroad Company is to be incorporated with \$40,000 capital to build a double track line connecting Gardenville and Ebenezer.

SYRACUSE, N. Y.—Elon R. Brown has been appointed referee in the foreclosure action of the Central Trust Company, of New York, against the Consolidated Street Railway Company.

NIAGARA FALLS, N. Y.—The Niagara Falls Electric Company has applied for incorporation with \$250,000 capital. Alexander Manning and other Toronto capitalists are interested.

NIAGARA FALLS, N. Y.—Cragee & Tensh are pushing work on the Niagara Falls & Lewiston Electric road. Construction is also progressing on the Buffalo & Niagara Falls Electric road.

NEW YORK, N. Y.—Edward Weils, Jr., is receiver of the Bently-Knight Electric Railway Company, on a judgment for \$101,484. in favor of the Thomson-Houston Electric Company.

NEW YORK, N. Y.—The Metropolitan Street Railway Company has mortgaged all its property to the New York Guarantee & Indemnity Company and Central Trust Company, for \$8,000,000.

LEROY, N. Y.—The Leroy & Northern Railroad Company has been incorporated to operate a steam and electric road in Genesee county. Capital, \$50,000; incorporators, C. F. Prentice, D. C. H. Prentice, N. L. Keeney and C. N. Keeney.

NEW YORK, N. Y.—The Westchester & William's Bridge Traction Company has been incorporated to operate a surface electric railway between the two villages. Capital, \$60,000; incorporators, G. P. Morgan, A. G. MacDonnell and Charles F. Tracy, of New York.

BROOKLYN, N. Y.—The Fulton Elevated Railroad has been consolidated with the Kings County Elevated Railroad Company. The two companies were practically the same and the former was organized for the purpose of extending the operation of the latter to East New York.

LOCKPORT, N. Y.—The city council has granted an extension of the Lock City Electric Railway franchise to Charles A. Johnson, a New York banker. The franchise will be forfeited unless one mile of additional track is laid by July 1, and four miles completed and cars running before fall.

MIDDLETOWN, N. Y.—The Middletown-Bloomingsburg Electric Railway Company has been incorporated, with \$200,000 capital, to build ten miles of road, by J. C. Hinchcliffe, John Hinchcliffe, Paterson, N. J.; W. B. Rockwell, Scranton, Pa.; E. G. Wightman, F. D. Le Bar, C. H. Smith, S. E. McIntyre, W. B. Royce, H. W. Wiggins, Middletown.

Ohio.

MANSFIELD, O.—The Citizens Street Railway Company will extend its line.

TIFFIN, O.—The sale of the street railways did not occur, on account of a defect in advertising.

MT. VERNON, O.—Subscriptions are being received for the Central Ohio Electric Railway Company.

TOLEDO, O.—The Toledo Electric Street Railway Company has increased its capital to \$1,750,000.

CLEVELAND, O.—The W. H. Elliott Electric Company has been incorporated, with \$10,000 capital.

IRONTON, O.—The Ironton & Petersburg Street Railway Company is advertised to be sold May 18, at master's sale.

MIDDLETOWN, O.—Receiver D. B. Bundy has been authorized to sell the Middletown & Madison Street Railway Company.

BUCYRUS, O.—The Inland Electric Railroad Company has been granted a franchise for 6 miles of electric line to Sulphur Springs.

CLEVELAND, O.—The United Motor Company has been incorporated with \$10,000 capital by J. H. Hoyt, H. H. McKeehan, A. C. Dustin and others.

SPRINGFIELD, O.—H. L. Canfield, Xenia, is securing right of way for an electric road to Wilmington, via Clifton, Cedarville and Jamestown. The water power at Clifton will be used.

BIRMINGHAM, O.—The Birmingham & Elyria Electric Railway Company is contemplating using steam or other practical motors instead of electricity and desires to correspond with manufacturers.

MIDDLETOWN, O.—The sale of the Middletown & Madison Street Railway by Receiver D. B. Bundy will be May 25. The real estate is valued at \$3,100; rolling stock, track, franchises, etc., at \$10,507.

XENIA, O.—Harry L. Canfield wants to get into correspondence with different manufacturers for eighteen miles 60 pound T rail, 0 and 00 trolley wire, poles, brackets, six double track cars 16 feet and up, with 20-horse-power motors, 100-K. W. generator, instruments, etc. Contracts will be let in sixty days. He will do all construction himself, except grading. Water power will be used, but a reserve steam plant will be put in.

CLEVELAND, O.—The Cleveland, Painesville & Eastern Railroad Company has been incorporated with \$25,000 capital by H. A. Everett, Julius E. French, J. A. Beidler, E. W. Moore, C. W. Wason, A. Everett, J. N. Topliff.

COLUMBUS, O.—The Adams-Bagnall Electric Company has been formed, to manufacture and deal in electric motors and apparatus. Capital stock, \$150,000; incorporators, Thomas E. Adams, E. J. Bagnall, Charles G. Hickox, H. W. Corning and T. H. Goff.

ZANESVILLE, O.—The Zanesville & Columbus Electric Railway Company has been incorporated to build the long talked of line to Columbus, along the old National road. Capital \$10,000; incorporators, W. J. Dungwieler, Albert Adams, A. W. Evans, L. W. Doan and A. A. Patterson.

WADSWORTH, O.—The Wadsworth Electric Railway Company has been incorporated with \$10,000 capital to build lines to Cleveland, Akron and Wooster, by F. G. McCauley, W. A. Ault, J. S. Oberholzer, O. V. Dibble, B. F. Weaver, Frank Mills, W. S. Holloway, Eli Overholt, M. C. Lytle, R. O. Hibel.

Oregon.

SALEM, ORE.—The Salem Motor Company will extend its line over Morningside hill.

ASTORIA, ORE.—The Bay Railway Company, in which F. J. Taylor is largely interested, has been granted a street railway franchise.

PORTLAND, ORE.—It is reported that J. M. Livesy, Port Townsend, representing an English syndicate, will consolidate the street railway systems.

Pennsylvania.

COLUMBIA, PA.—The Columbia, Mt. Joy & Ironville Electric Railway Company will be built.

PHILADELPHIA, PA.—The Union Passenger Railway Company has applied for franchises on several streets.

SHARON, PA.—The Shenango Valley Street Railway Company has shortened its name to Valley Street Railway Company.

WILLIAMSPORT, PA.—The Edgewood & Sulphur Springs Passenger Railway Company has been incorporated with \$10,000 capital.

BOSTON, PA.—The Versailles Street Railway Company will extend its tracks 8 miles to Buena Vista, Scott Haven and West Newton.

CHESTER, PA.—The Prospect Street Railway Company has been incorporated with \$50,000 capital. Crosby M. Black is president.

PHILADELPHIA, PA.—The plans of the Fairmount Park & Heddington Railway Company for lines on various streets have been approved.

SCRANTON, PA.—Henry H. Archer is president of the Scranton & Bald Mountain Railroad Company, incorporated with \$100,000 capital.

MUNCY, PA.—The Muncy Valley Street Railway Company has been incorporated, with \$50,000 capital, to build an electric line to Picture Rocks.

MEDIA, PA.—The Media, Middletown, Aston & Chester Electric Railway Company will increase its capital to \$150,000 and work will be pushed.

MCKEESPORT, PA.—The McKeesport & Wilmerding Electric Railway Company will let contracts April 22, for the extension of its line to Pitcairn.

PITTSBURG, PA.—The Oliver & Roberts Wire Company has applied for a franchise for the Allegheny & Southside Street Railway Company for its private use.

GREENSBURGH, PA.—Webb & Perkins, of Williamsport, have been awarded the contract to build an electric railway to Turtle Creek, a distance of 20 miles.

HARRISBURG, PA.—The Harrisburg Traction Company will be incorporated to consolidate the Citizen's line and the East Harrisburg Passenger Railway Company.

READING, PA.—After three years in the city council in various forms the ordinance granting extensions of the Reading & Southwestern Street Railway Company has been passed over the mayor's veto.

NORWOOD, PA.—The Warwick Street Railway Company has been incorporated with \$50,000 capital by Isaac H. Rhoads, Eli B. Hallowell, Harry Collins and others to run to Glenolden and Sharon Hill.

TOWANDA, PA.—The Towanda Traction Company has been organized with W. A. Heller, Allentown, president; B. T. Hale, secretary and treasurer. Six miles of road will be built from North Towanda to Greenwood.

HARRISBURG, PA.—The Monongahela Traction Company has been incorporated with \$5,000 capital by A. D. Woods, J. F. Davitt, R. G. Woods, Richard Fickling, J. Harper Adams, to consolidate the Homestead and Highland lines.

PITTSBURG, PA.—The Pittsburg, Greenburgh & Latrobe Electric Railway Company has been incorporated as a part of the Sadler syndicate. Capital, \$5,000; incorporators, Alan D. Woods, John F. Davitt, Richard Fickling and J. Harper Adams.

Rhode Island.

PROVIDENCE, R. I.—The Inter State Consolidated Street Railway Company has been organized with M. J. Perry, Providence, president; Edward R. Price, North Attleboro, Mass., secretary and treasurer.

South Dakota.

SIOUX FALLS, S. D.—The Central Trust Company, New York, has applied for a receiver for the South Dakota Rapid Transit & Railway Company.

Tennessee.

ROSSVILLE, TENN.—D. M. Stewart is projecting an electric line to Chickamauga Park.

CHATTANOOGA, TENN.—Negotiations are in progress to take the Chattanooga Electric Railway Company out of the hands of the receiver, and extend it to Chickamauga park.

ROSSVILLE, TENN.—The following have organized to build an electric road to the Chickamauga-Chattanooga Military Park: D. M. Stewart, president; J. R. McFarland, vice-president; John M. McFarland, secretary; A. L. Ross, J. M. Rife, G. O. Fisher, Joseph Aull, G. P. Wilbanks, directors. Surveyors have been put in the field.

Texas.

DALLAS, TEX.—The Dallas & Oak Cliff Railway Company will extend its lines to Ft. Worth.

SAN ANTONIO, TEX.—The cross town street railway was sold by the receiver to F. A. Piper for \$1,650.

DALLAS, TEXAS.—Paul Furst has been appointed receiver for the Queen City Railway Company on application of the State Trust Company, Boston.

GALVESTON, TEX.—The D. A. Thompson Company, North Carolina, has applied for a receiver for the Galveston City Railroad Company. President Sinclair says the company is solvent.

DENISON, TEX.—George McLagon, secretary of the Denison Street Electric Railway Company is in the market for one 500-volt generator, three 16-foot cars with single electrical equipment of 25-horse-power each, or a double equipment of 15-horse-power.

Vermont.

BRATTLEBORO, VT.—The Brattleboro Street Railway Company has let the contract for building its line to M. A. Cooledge, Fitchburg.

Virginia.

DANVILLE, VA.—The Danville Electric Railway will be extended.

RICHMOND, VA.—The Richmond Railway & Electric Company will electrically equip its Broad street line.

CHARLOTTESVILLE, VA.—It is reported that the Piedmont Construction & Improvement Company will rebuild the Frys Spring Street Railway Company for electric equipment.

Washington.

TACOMA, WASH.—Paul Schultze, president of the Tacoma Railway & Motor Company, committed suicide, April 12, by shooting himself. Mr. Schultze was born in 1848, and was general land agent of the Northern Pacific for many years. A consolidation of departments was made recently and his resignation was demanded, which, it is believed, so preyed upon his mind as to cause him to take his life.

West Virginia.

CHARLESTON, W. VA.—The Charleston Street Railway Company will extend its lines.

GRAFTON, W. VA.—The Grafton Traction Company has been incorporated to build an electric line to Pruntytown. Capital, \$150,000; \$600 paid in; incorporators, F. A. Malan, H. M. Sommerville and E. T. Malan.

Wisconsin.

OSHKOSH, WIS.—J. K. Tillotson has assigned his interurban franchise to the Central Wisconsin Railway Company.

BARABOO, WIS.—The Sauk County Improvement Company has applied for an electric road franchise from Devil's Lake to Kilbourn City.

MILWAUKEE, WIS.—The directors of the Milwaukee & Wauwatosa motor line have decided to begin at once the equipment with electricity and to proceed with the Waukesha extension.



I seen ter-day Mariar, a-glidin' down the lane,
A funny sorter creetur which I hope I won't again,
She rid one o' them cycles that don't make any noise,
An' bless my heart! Mariar, she wuz dressed up like the boys,
She came along cavortin' jist as a yearlin' spurts,
A-flutterin' her tresses—an' she wore derwided skirts:
Her skirts they wuz derwided, I think I said afore:
Ye oughter to seen Mariar, the ground she kivered o'er,
A-slashin' o' them pedals, a humpin' o' them wheels,
A-cuttin' up them capers that sorter brings appeals
Ter pussons like yer Isaac, who ain't no sorter go—
Espashally to city gals a-ridin' out fur show.
Her stockin's made me snicker; hur ankles they wuz trim—
Accordin' ter my jedgment she'd a proper sorter limb.
'Twuz jist a passin' vision I glanced at on the sly
While hid behind the rail fence an' a reskin my off eye.

A Delightful Morning Ride.

"I have no sort of patience," said the traveling man, blowing a particularly dense volume of smoke into the air, "with these folks that hate to get up before nine o'clock in the morning. Now, I travel a good deal; and there are just two times in the day when I most enjoy traveling—that is, railroading. One is in the morning from five to eight or nine, and the other is in the evening. An all-night ride I don't care for, and an all-day ride doesn't give me any great throb of pleasure; but there is one particularly early morning ride that I take a good deal that I enjoy very much; and that's the ride from New London up to Boston on the train that leaves the Norwich Line boat.

"You board the train at a quarter after five; the best time of the day for a spin on the rails, when everything is fresh and the dust hasn't been stirred up; but what I like particularly about this ride is the delightful scenery along the banks of the Thames. That river isn't half appreciated, except by the college boys who go there to row every June. It is a beautiful river from New London up to Norwich, and a good distance beyond. Did you ever ride up the western bank in the early morning? You get at least a dozen sunrises. You will see it peeping over one hill and then disappearing behind another, and then coming up again. If anybody likes the sunrise, he can get it by wholesale in taking this ride from the Norwich Line boat. And then the river is so pretty, with its occasional stretches of rapid water, and here and there a little cascade; and as for Norwich itself, with its bridges and tunnels and terraces, and the houses away up over your head ready to slide off, it's a charming place; and then you have just ride enough to give you a good appetite, so when you strike Boston you can sit down to breakfast with some enjoyment."

"Yes," he went on, retrospectively, "I've gone over the road quite a bit, and I must say of all the rail riding I've done I do like most that morning spin up from New London; and I have my opinion of any man who is so very lazy that he isn't willing to get up at the whole-some-hour of five o'clock to take it."

Half Fare to Chattanooga and Return for the Epworth League Convention in June.

On June 25, 26 and 27, 1895, the Monon Route will sell tickets at rate of one fare for the round trip from all points on its line to Chattanooga and return on account of the Second International Conference of the Epworth League. These rates and tickets will be open to all. Tickets will be limited to return fifteen days from date of sale, but can be extended fifteen days by depositing with agents of Q & C. or Nashville & Chattanooga Railways before June 30.

A choice of routes via Cincinnati, the Blue Grass regions of Kentucky and the mountains of Tennessee, or via Louisville and the Cave regions of Kentucky, with side trips to Mammoth Cave at a nominal expense, makes the Monon Route the most desirable line between Chicago and Chattanooga, Tenn.

The day trains of the Monon Route, both via Louisville and Cincinnati, carry parlor cars and dining cars, serving meals same as at a first-class cafe. Patrons can order what they want and need only pay for what they get.

The evening trains carry luxurious palace sleeping cars from Chicago to Cincinnati or Louisville. The sleeping car rate from Chicago to the Ohio River, or from the Ohio River to Chattanooga, is \$2.00 per berth, whether occupied by one or two persons.

Parties wishing to view the mountain scenery of the south should leave Chicago on the evening trains, so as to make the trip from Cincinnati or Louisville to Chattanooga by daylight, arriving at Chattanooga for supper. Those wishing to visit Mammoth Cave should leave Chicago at 8:32 p. m., arriving at Louisville for breakfast and at the cave for dinner, remaining at the cave until next morning, leaving at nine o'clock, and arriving at Chattanooga for supper.

The side trip from Glasgow Junction to Mammoth Cave will cost but \$1.25; hotel bill and cave fees will be very reasonable. The guides go into the cave between two and three o'clock p. m. and at eight o'clock in the evening, thus giving those who wish a chance to make two trips in the cave the same day.

Further information, with time tables, maps and pamphlets, will be furnished on application to any agent of the Monon Route, or by addressing

FRANK J. REED,
General Passenger Agent.

WHAT STREET RAILWAYS ARE COMING TO.

Extracts from Chicago Newspaper Reports in 1895.

A syndicate of railways, it is said, contemplate seizing the entire downtown district on the first dark night.—Chicago Record.

Last night the Excelsior General Transit Company chloroformed ten policemen on the west side and stole one mile and a half of street.

A meeting of the directors of one of the transportation companies will be called to-night to discuss the advisability of mobilizing troops against its rival road.

The police officer who interfered with two fighting street car officials was caught by the superintendent of the road yesterday, court-martialed and shot.

It is said that the dispute concerning the legal rights to the use of Michigan avenue by rival street railway companies will be fought out to-night with shotguns.

It is said that Eddysson, the inventor, has designed a patent bomb-proof trolley car with a powerful ram which could be used in crushing barricades. The Killem trolley company has secured an option to purchase.

Bulletins from the scene of the great south side conflict indicate that the railway company which claims to own the tracks is arming its men with Martini-Henry rifles and will mobilize its forces in a few days.

Much excitement has been created among street railway men by the reported discovery of a street which nobody owns. The street, it is said, is not strongly guarded at night and could be taken in a single assault.

Extra—On the Battlefield—The Killem trolley company massed its cavalry on the car tracks fifteen minutes ago and has won an important strategic position, taking eighty-five prisoners and utterly destroying three trolley battle cars.

Superintendent Hogitall of the Grab cable company was placed on the witness stand and testified that he had justification for killing the policeman, Maherty. Maherty, the superintendent says, tried to interfere with an interesting free fight that the superintendent was personally conducting.

THE ROBERTS CONTINUOUS BRAKE.

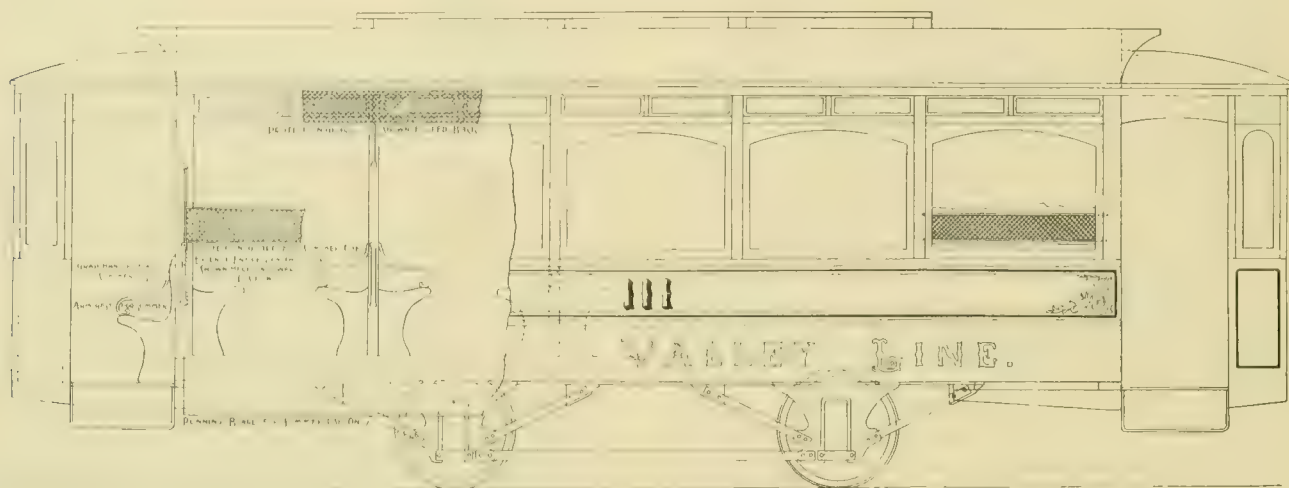
A brake which has been attracting some attention in England is known as the Roberts Continuous Automatic Brake and is the invention of a Bradford man. It depends for its action on the pull that is being applied to the drawbar of the car. When no pull is being exerted, the weight of the car by a system of levers applies the brakes. As soon as there is a pull on the drawbar the brakes are released. Arrangement is made so that the force of brake application is proportional to the load on the car. The brake can be released independently of the drawbar pull if desired.

STEAM RAILROAD CAN NOT OPERATE A STREET RAILWAY.

Between Bridgeport and Swedeland, Pa., is a new electric railway $1\frac{1}{4}$ miles long, known as the Montgomery Passenger Railway branch of the Schuylkill Valley Traction Company, Norristown. As the route lies over

HENRY'S CONVERTIBLE CAR.

As much as convertible cars seem to be needed, they do not seem to have made much progress. The semi-annual change from one equipment to another involves considerable time and expense, unless motors and trucks are purchased for both summer and winter car bodies,



HENRY CONVERTIBLE CAR.

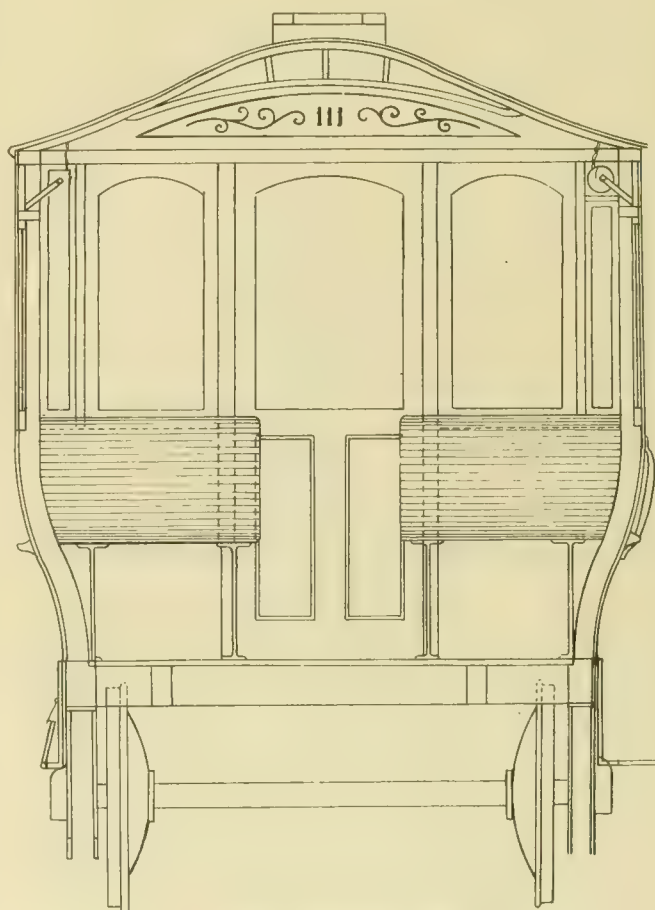
a public highway the line came under the ban of the recent supreme court decision that franchises could not be given to street railways on country roads. Thereupon, the Bridgeport Railroad Company was chartered under the general railroad act of 1868, with the full powers of a steam railroad, and undertook to operate the line to Swedeland. But the Pennsylvania Railroad Company, for reasons best known to itself, objected to the operation of the road, and brought suit for an injunction to restrain the Bridgeport Railroad Company from constructing or operating it. The injunction was granted by Judge Swartz on the ground that a street passenger railway can not be constructed under the act of 1868, and that the railway in question was really a street passenger railway, and not a steam road, as the name of the Bridgeport Company would indicate.

GAS ENGINES FOR ROAD TRACTION.

The use of gas engines in place of horses as motive power in hauling freight over common roads has been seriously considered by gas engine makers in the past few years. It is even proposed to enter into competition with steam railroads for short hauls.

At the present stage of improvement it is claimed a gas engine of 20-horse-power will haul 20 tons of freight 100 miles in 12 hours at a cost of \$20. The cost includes \$10 for the gasoline consumed in the day's run, \$3 for the wages of one man, \$2 for his assistant, and \$5 for interest on investment and depreciation of equipment. The above cost is equivalent to a freight rate of 5 cents per 100 pounds, or 10 cents per 100, if the wagon train must return empty for another load. The charges of steam railroads are largely in excess of 10 cents per 100.

and few roads can stand such a heavy investment. This of course makes a convertible car very desirable, but none



END VIEW HENRY CAR.

seem to have been brought out heretofore, that meet the approval of any considerable number of street rail-

way men. President D. F. Henry, of the Federal Street & Pleasant Valley Passenger Railway of Pittsburg, has had some convertible cars of his own design on his road for some time. The St. Louis Car Company is now engaged in building twenty cars of similar design for that road, so that the car is evidently proving satisfactory.

The car is built practically the same as a summer car as regards frame and pillars. The sides for winter use are removable by taking out twenty screws. Then by putting on the running board and grab handles, the change to summer car is complete.

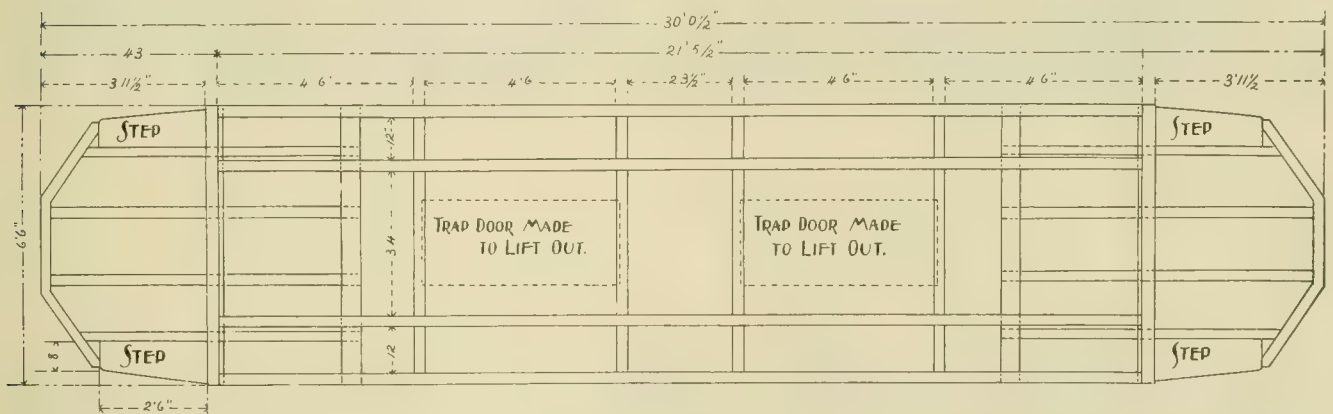
The length of the car body is 22 feet 1 inch; over all, 30 feet $\frac{1}{2}$ inch; width over sills 6 feet 7 inches; at belt rails 7 feet 10 inches. Oak timber forms the sills; ash, the upper frames, and ash and cherry the interior finish of doors, sash, linings, panels and mouldings. The seats are movable, contain springs and are covered with rattan in summer and Wilton carpet in winter. The platforms are vestibuled, and electric signal bells are provided throughout.

The illustrations which are given herewith, show

GENERAL ELECTRIC ANNUAL REPORT.

By liquidating and adhering to the policy of selling for cash, or on short time, the General Electric Company has not only collected enough cash to retire all its floating and reduce its funding debt, but has had sufficient capital to pay cash for all its purchases during the year. In addition, the company has purchased and cancelled \$1,250,000 of its own debentures at an average cost of less than 89 per cent. There was a net profit of \$414,642.72. In regard to the outlook, Pres. C. A. Coffin says in his report: "The indications are favorable for a volume of business in excess of that of last year; but prices are abnormally low, and satisfactory results will largely depend upon the ability of your company still further to reduce the cost of production and distribution of its manufactures."

Much has been accomplished by the engineering department in the development of large units, as well as in the perfection of the minor details of manufacture. The only successful work yet accomplished in the operation of elevated roads by electricity has been done by



PLAN HENRY CONVERTIBLE CAR.

the side and end elevations and the plan. The side view gives a good idea of the appearance of the car, one end being represented as open and the other as closed.

this company, and it is now engaged in important installations of underground electric conduits for street railways. The business of the year amounted to \$13,263,611.58, cost of goods sold, legal and general expenses, \$11,451,863.98; leaving a gross profit of \$1,811,747.60.

STANDARD ELECTRIC COMPANY.

In order to provide increased facilities that will enable it to promptly and properly care for recent orders and future business, the Standard Electric Company, of Chicago, has increased its capital stock from \$1,000,000 to \$1,500,000, and is considering the leasing of one of the largest factories in the west. A. G. Spalding, the well-known lover of field sports and head of the firm of A. G. Spalding & Bros., has been elected to the presidency. Mr. Spalding has bought a large interest and will take hold of affairs with his usual enterprise. S. P. Parmly has resigned the presidency, but will continue a director.

The Daniels Steel R. R. Tie Co., Youngstown, Ohio, has received the following unsolicited letter from J. H. Miller, city engineer of Newcastle, Pa.: "From my observation, the corrugated steel cross ties used in the construction of the Newcastle Street Railway on Mill street, in this city, in 1894, are giving entire satisfaction. The track and pavement are both in better condition where the steel ties were used than where the track was laid on wooden ties. The cars were run over the portion of the track wherever ties were placed within four days after the concrete was laid, thus giving a very severe test to the construction. I should very much prefer the steel to the wooden tie on paved streets."

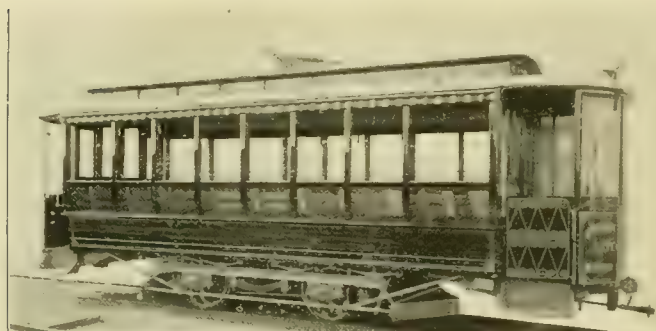
E. E. Crepin, treasurer, and D. P. Perry, general manager, retain their positions. The other directors are Gilbert B. Shaw, president of the American Trust & Savings Bank, Chicago, J. P. Whitney, a capitalist of Philadelphia, and G. A. Rollins, a capitalist of Boston, Mass. The Standard is the company that installed the service plant in the machinery hall, World's Fair. This plant made a record of over 25,000,000 arc lamp hours, nearly 20 per cent more than any other arc plant in the exposition, without the loss of an armature or even an armature coil.

SOMETHING NEW IN CARS.

Sixteen motor cars have been built for the Oakland Street Railway Company, Dayton, O., which present

arrangement for seating is such that the winter cushions and backs can be taken out and replaced with the summer equipment in five minutes, by means of a patent detachable back. The vestibule is so arranged that it can be taken off if desired, but the Oakwood people say they prefer to have it left on the year round. The center sash is arranged so as to slide open at one side to give ventilation and room to operate switches. The interior of the car is finished in cherry with white maple headlining, decorated.

The cars are mounted on Barney & Smith Standard, Class A, motor trucks, with body bracing for the extreme length, and equipped with G. E. 800 motors. The Barney & Smith Car Company, which built these cars, believes them to be the most complete cars ever placed in service up to this time.



SOMETHING NEW IN CARS

some new features. The photographs show exterior and interior views of the same car arranged for summer and for winter service. In changing from winter to summer style the panels and sash come out, but the roller curtain

The Oakland Street Railway Company, has adopted electric traction. Hoadley Bros., Old Colony Building, Chicago, put in the steam plant, which consists of two Wheelock engines of 400-horse-power each, driving



COOL IN SUMMER AND WARM IN WINTER.

remains. A storm curtain is provided, so that the entire side opening on both sides of the car is entirely covered, fully protecting the passengers in case of a storm. The

General Electric generators with rope transmission, and boilers of 400-horse-power each, which were built by a Milwaukee concern.



The Union Depot Railroad, of St. Louis, will install a 1,500-kilowatt generator of the General Electric make this year.

The western office of C. A. Schieren & Co., reports a larger business than for a corresponding period in several years.

The Schultz Belting Company has moved its Chicago depot to 42 South Canal street, where it has more room and a larger stock than heretofore.

William Wharton, Jr., & Co., Philadelphia, have the contract for 10 miles of electric road, from Sixty-third street, Philadelphia, to Castle Road.

The General Electric Company, of New York, has contracted to furnish twenty standard 800 motors to the Wheeling, W. Va., Railway Company.

The Sweet Electric Company, Grand Rapids, Mich., has given E. H. Donnally, trustee, a trust mortgage covering all its effects for the benefit of the creditors.

The Graham Equipment Company, Providence, R. I., has assigned to George W. Stafford. Creditors are requested to make immediate return of indebtedness.

The McGuire Manufacturing Co., Chicago, sold 68 single A1 suspension trucks to be equipped with G. E. 1200 motors to the Cincinnati Street Railway Company.

S. F. B. Morse & Co., Chicago, western agents for Day's Kerite, have moved to 1014 and 1015 Marquette building, where they have handsomely furnished offices.

M. J. Degnon, of Columbus, O., has been awarded the contract to construct the Columbus Central Electric Railway in that city and to Westerville, a distance of 16 miles.

The Metropolitan Electric Company, Chicago, are handling the portable hose bridge illustrated and described in our March issue. Inquiries are coming in from all directions.

Charles S. Burrell, brother of Ernest Burrell, western manager of C. A. Schieren & Co., has gone into the electrical contracting line, at 46 and 48 South Canal street, Chicago.

B. J. Arnold, consulting and constructing engineer, has moved his offices to the Marquette building, Dearborn and Adams streets, where he is pleasantly located in suite 1541, telephone, main 4072.

Funkhouser & Coates have been given the contract to relay $2\frac{1}{4}$ miles of track for the Beaver Valley Traction Company, at New Brighton, Pa. New 85-pound rails will be laid, and the total cost will be \$30,000.

H. A. Reeves, sales agent for the H. W. Johns Manufacturing Company, closed the contract for all the hangers, pull-overs, ears and mechanical clips, for 17 miles of the Tacoma Traction Company, Tacoma, Wash.

W. T. Van Dorn, has established an office at 1336 Monadnock building, Chicago, for the Fitzgerald-Van Dorn Company, Lincoln, Neb. A full line of samples of the Van Dorn automatic draw bar will be always on hand.

Notice has been sent to the stockholders and creditors of the Lewis & Fowler Manufacturing Company to show cause June 8 before Judge Gaynor, Brooklyn, why the corporation should not be dissolved. It is reported that a plan of reorganization is being considered.

During the past 30 days there has been sold 494 equipments of the Crawford fender, including 200 for the Philadelphia Traction Company; 110 for the Atlantic Avenue, Brooklyn; 58 for Rochester, N. Y.; 59 to Dayton, O., and 3 for Rio de Janeiro, Brazil.

The Pennsylvania Steel Company, of Steelton, has been awarded the contract to furnish structural steel for the Boston subway. A large portion of the contract calls for an I beam of unusually large size, for the rolling of which the Pennsylvania Steel Company possesses special facilities.

Crage & Tench, general contractors, have opened an office in the Tower hotel building, Niagara Falls, N. Y. They are constructing the Niagara Falls & Lewiston Electric Railway Company's line. This firm has constructed several street railways. Some material is wanted and contracts for cars have not been placed.

One of the largest calendars we have ever seen was sent the REVIEW by the Southern Railway Company, over one of whose lines the street railway men went from Chattanooga to Atlanta. The calendar can be seen from a distance and is about five feet long. It is worth a place in any office, where it is necessary to look up dates.

The Fuel Economizer Company, Matteawan, N. Y., is quite busy. Among recent contracts for economizers are: New Jersey Consolidated Traction Company, 2,500-horse-power; St. Charles Street Railroad Company, New Orleans, 750-horse-power; Detroit Railway, Detroit, 2,000-horse-power; Holyoke Street Railway Company, 800-horse-power; Howland Crofts & Son, Camden, N. J., 1,000-horse-power; Crystal Plate Glass Company, St. Louis, 2,400-horse-power.

E. F. DeWitt, the sandbox man, Lansingburgh, N. Y., keeps moving around the country and selling sandboxes wherever he goes. He sold 175 common sense sandboxes to the West End road of Boston, and on his way to Baltimore stopped off at Hartford and sold a fourth order of 25. In Baltimore he placed an order for 30 boxes with the Baltimore Passenger Railway, and hasn't got through yet.

The New Jersey Asbestos Company, whose office and factory is at 117 Front street, Camden, N. J., is distributing an illustrated catalog of its asbestos and asbesto-metallic high pressure steam packings and jointings, boiler and pipe coverings and asbestos materials of all kinds. The book contains much valuable information and can be obtained at the factory or at the Philadelphia office, 838 Drexel building.

W. S. Louttit, formerly with the Pullman Company, has opened an office at 80 Dexter building, Chicago, as western agent for Thomas Smith & Son, railroad lamps, New York; Sterling Supply & Manufacturing Company, street railway supplies, New York, and the R. A. Crawford Manufacturing Company, fenders, Philadelphia, Pa. Mr. Louttit has a large acquaintance in the street railway world, and will no doubt make a success of his new venture.

The Duff Manufacturing Company, Allegheny, Pa., reports a large number of sales of the Barrett lifting jacks. Street railway companies find the smaller size jacks very convenient to have in the cars, as they take up little room and are always ready for use when an obstruction is to be moved, saving considerable time, as no wait is necessary for the arrival of the wreck wagon. There is also a good demand for the size that is used in car barns.

Eugene Munsell & Co., New York, have issued a new price list of their electrical mica and micanite. It is conveniently arranged and illustrated, containing a full description of what the firm has in stock, and opposite each size is a code word, which makes it unnecessary to consult an appendix, and insures accuracy. Munsell & Co., being interested in mica mines, obtain all their supplies direct, and have constantly a large stock at their warerooms.

The Central Electric Company, Chicago, has been appointed western agent for the drop forged overhead material of the Billings & Spencer Company, Hartford, Conn. This material is coming into great favor with street railway companies, and is highly praised by those who have used it. The Central Electric Company is in position to supply this specialty in quick time. It has increased its force of traveling representatives, and has eight men constantly on the road.

The Chicago office of the Babcock & Wilcox Company has sold 2,000-horse-power, 8 units of 250-horse-

power each, wrought steel construction water tube boilers, to the Detroit Citizens' Street Railway Company; 365-horse-power to the Edison light plant, at Detroit; also sold 3,000-horse-power in February. The Babcock & Wilcox Company have reached the million and a half horse-power mark. In 25 years less than 2 per cent of this immense output of boilers have been taken out of service for any cause. The foreign department is doing a large business.

James Boyd & Bro., manufacturers of and dealers in electric railway supplies at 14 North Fourth street, Philadelphia, Pa., have issued an illustrated catalog and price list of 160 pages, bound in a flexible cloth cover, and of a size to fit conveniently in the pocket. The catalog covers only such material as is especially adapted to railway work. In addition to the catalog proper are a copious index, a telegraphic cipher code and twenty tables of great value to builders of electric railways. It was compiled by S. L. Nicholson, manager of the railway department.

The Adams-Bagnall Electric Company has been formed at Cleveland, Ohio, to manufacture railway motors, arc and incandescent lamps. The company is now purchasing the equipment for its factory at 47 East Prospect street. Some of Cleveland's active business men have subscribed for the \$150,000 capital stock; and the officers of the company are Charles O. Hickox, president; George W. Hone, vice president and treasurer; L. H. Rogers, manager; S. E. Cox, secretary, and C. W. Phillips, superintendent. Thomas Adams, E. J. Bagnall, George Arnold, and Prof. Dodd, all well known in the electrical world, will identify themselves with the new company.

A welcome ornament for the parlor and library, and entirely out of the usual form of railroad advertising, is the handsomely illustrated and bound volume "Sketches of Wonderland." It contains not only numerous illustrations of the wild scenery along the Northern Pacific Railroad and in the Yellowstone Park, but much on Puget Sound and Alaska, accompanied by a text which is a most interesting guide book. A book of travel of this character is seldom sold at a less price than \$1, but our readers, by mentioning the STREET RAILWAY REVIEW and sending six cents to cover postage, can secure a copy free by addressing Charles S. Fee, St. Paul, Minn.

As time goes on, the well-known P. & B. insulating compound, armature and field coil varnish, insulating tape, preservative paints, etc., manufactured by the Standard Paint Company, New York and Chicago, are in larger demand than ever. For ten years they have been used by the largest electrical consumers and manufacturers in the world, who have found them so satisfactory that they continue to use them and recommend them. The company is quite busy on orders from street railways and reports an increasing demand from this class of trade, many new customers being secured.

Those who are unacquainted with these specialties should investigate them and secure samples, circulars and price lists. The P. & B. ruberoid roofing is coming into general use for central stations for which it is specially adapted, although it can be used for any kind of roof.

The William Sharpe Company, Monadnock building, has successfully installed two McEwen engines 15 x 16, of 160-horse-power each, running 275 revolutions, direct connected to two 100-kilowatt Thompson-Ryan dynamos for A. M. Rothschild & Co. The Thompson-Ryan dynamo, which is manufactured by the J. H. McEwen Manufacturing Company, Ridgway, Pa., is a new departure in dynamo building, and was recently described by its inventors before the Institute of Electrical Engineers. It has balancing coils in series with the armature, which are said to eliminate armature reaction, giving a maximum amount of work for a small amount of material. The units ran very smoothly, and although no tests have been made, it is believed that they will fully come up to expectations. The McEwen company is building two 200-kilowatt generators for Pepper & Register, Philadelphia, for street railway work, which will soon be installed.

Sheaff & Jaastad, architects and engineers for railway power stations, Boston, Mass., are very busy at the present time. They have nearly completed the plans for the power house of the New York, New Haven & Hartford Railroad, which is to be located at Nantasket, on the Boston and Nantasket Beach line. This station will be equipped with 2 multipolar 500-kilowatt generators, wound for 600 volts; 2 tandem-compound, condensing engines of 800-horse-power, taking steam from 8 tubular boilers. Sheaff & Jaastad are also at work on plans for the power station of the Portland, Me., Railroad Company. In this station they will place 2 multipolar 500-kilowatt and 1 multipolar 200-kilowatt direct-connected generators. The 3 engines are to be cross-compound, 2 of 500 and 1 of 250-horse-power, built by the Edw. P. Allis Company, and will exhaust into condensers of the Allis standard pattern. The boilers will be of the Babcock & Wilcox type.

The Genett Air-Brake Company has removed its New York office to 35 Wall street, Mills building. A contract has just been made for 30 Genett air brake equipments for the double truck cars of the new electric line which is being built between Buffalo and Niagara Falls by the White-Crosby Company. Cars on this line are expected to run at the rate of 40 miles an hour, rendering it absolutely necessary to have a reliable brake. Fifty Genett brakes are being furnished the Atlantic Avenue Railroad, Brooklyn, and the Albany, N. Y., Railway has bought a trial equipment. A duplicate order of Genett brakes has been shipped to Bristol, Eng., making twelve equipments. Last November, the railway commissioners procured some Genett air brake equipments for the Ocean Steam Tramway, Sidney, Australia, as an

experiment. The result is that the Genett Air-Brake Company, on March 1, was given orders to equip all of the 44 cars on that line.

The Forest City Electric Works of Cleveland, Ohio, manufacturers of the well known "roll drop" commutator segments for dynamos and motors have established an office in New York which will have general oversight of the eastern territory. John C. Dolph, formerly connected with the Short Electric Railway Company, and for the past two years eastern representative of the Eureka Tempered Copper Company, has been appointed manager of the above district. It is the policy of the company to push vigorously the sale of its products in eastern territory. A large stock of standard street railway and lighting segments will be carried in the New York storeroom.

The Hoppes Manufacturing Company, Springfield, O., has established a branch office at 512 Security building, St. Louis, Mo., where its rapidly increasing business in live steam feed water purifiers and exhaust steam feed water heaters will be cared for by A. W. Remnitz, who possesses a large acquaintance among steam users in that territory. Recent shipments of the Hoppes purifier have been made to Nurdyke & Marmon Company, Indianapolis, one 300-horse-power, one 150-horse-power; Indianapolis, Ind., Abattoir Company, 300-horse-power; Butters & Peters, Ludington, Mich., 1,000-horse-power; Johnson Company, Lorain, O., 3,350-horse-power; Rosengarten & Sons, Philadelphia, 200-horse-power; New York Tartar Company, 1,000-horse-power; Hudnut Company, Terre Haute, Ind., 250-horse-power; Hamilton, O., Electric Light Plant, 400-horse-power; Crystal Ice Company, Anderson, Ind., 300-horse-power; Aetna, Ind., Powder Company, 100-horse-power, and Detroit, Mich., Citizens Street railway Company, 2,000-horse-power.

The Walker Manufacturing Company, Cleveland O., has a large amount of general work on hand and is operating its shops day and night. Some recent orders are three 200-kilowatt, direct-connected, multipolar generators, from St. Charles Street Railroad Company, New Orleans, La.; two 250-kilowatt belted generators, three double car equipments, 50-horse power steel motors, two double car equipments, 30-horse-power steel motors, from Norfolk, Va., & Ocean View Railroad Company; one 200-kilowatt belted generator, from Richmond, Va., Railway & Electric Company; twelve double car equipments with twenty-four 25-horse-power steel motors, from Philadelphia Construction Company, for the Schuylkill Electric Railway, Pottsville; and six complete car equipments with twelve 30-horse-power steel motors, sixty type B 2 controllers and thirty rheostats, from Missouri Railroad Company, St. Louis. The April orders aggregate 850 kilowatts of direct-connected and 960 kilowatts of belted generators, and over 3,100-horse-power of steel motors.

J. G. McMichael, 1654-6 Monadnock building, has secured the western agency of the Wheeler rail joint.

Fisher & Porter, report a good business in steel forgings for the Bethlehem Iron Company. Orders are quite plentiful, especially from large engine builders.

The Chicago office of the Edward P. Allis Company, has sold two cross-compound condensing engines of 1,000-horse-power 26 and 40 x 48, to the Cicero & Proviso Street Railway Company, to be direct connected to Siemens & Halske generators.

Stanley Green, western agent for the Fuel Economizer Company, Matteawan, N. Y., has removed his office to 1540 Marquette building. He has just closed a contract with the Dominion Cotton Mills, Montreal, for 1,000-horse-power of fuel economizers.

Kohler Bros., have closed a contract for twenty Walker 25-horse-power railway motors, with the Aurora, Ill., Street Railway Company; one 75-kilowatt Walker power generator, with J. H. Garrity, manager of the Wellsville Coal Company; besides several smaller contracts for motors, etc.

The Metropolitan Electric Company has secured the exclusive agency for the United States, for the Ayer self-locking windlass, which has many improvements over other styles, and recommends itself at sight to practical station men. The company is selling a great many Dayton electric ceiling fans.

The American Car Company, St. Louis, has delivered several cars to the Los Angeles Consolidated Electric Railway Company. They are 35 feet long, 8½ feet wide, 21 feet being enclosed with sixteen cross seats. Ten feet in the rear is reserved for a smoking compartment, and the controller end has 4 feet of space with vestibule. The cars are equipped with Westinghouse motors and controllers and Genett air brakes.

The Ball & Wood Company, of New York, has a number of engines in preparation for many western as well as eastern points. C. E. Sargent, the Chicago representative of this company, has recently removed to his new offices, 404 Fort Dearborn building. He has obtained the contract for several cross-compound Ball & Wood engines for the new Milwaukee city hall. These engines are also being installed in the Temple of Music, Chicago, Grace Hotel, Fort Dearborn building, and for Morgan & Wright. At St. Paul, George M. Kenyon has placed a Ball & Wood engine in the Manhattan building. Recent eastern buyers of Ball & Wood engines include St. Luke's Hospital, Manhattan Storage Warehouse Company, New York, New York Central Railroad, Syracuse, Stoutenburgh & Co., Newark, and the Danbury & Bethel Horse Railway Company, Danbury, Conn. The latter is a second order for a 425-horse-power cross compound.

NEW ENGINE COMPANY.

By the combination of the interests of the Wheelock engine, Worcester, Mass., Greene engine, Providence, R. I., with Hoadley Bros., Chicago, and William Cramp & Sons, Philadelphia, the American-Wheelock Engine Company has been organized. Edwin S. Cramp is president; Alfred H. Hoadley, vice-president; Joseph H. Hoadley, secretary and treasurer, and Edward K. Hill, formerly president of the Wheelock Engine Company, general manager. The plant of the Wheelock Engine Company, at Worcester, occupying 90,723 feet of land, has been purchased, together with the Hill and Wheelock engine patents, and those of N. T. Greene, of Providence, R. I.

The new company has ample facilities, and with the combination of the best features of these two engines should be able to place upon the market an engine of the highest efficiency and economy, which will cause the other engine builders a deal of trouble in competition. The new company will enlarge the Wheelock works and make extensive improvements at Providence.

The old firm of Cramp & Sons, has a vast amount of capital and resources, and has a world wide reputation as builders of steamships. The Hoadley Bros. are also strong and well known in street railway and electrical construction work. The extensive Cramp works will make the building of stationary engines under the newly acquired patents, a special feature of its future operations. The combination of patents makes it possible to build an engine capable of producing the high speed required for large ocean steamers and United States cruisers, with great economy in the cost of fuel. In connection with furnishing power for street railway plants, the same features will be available. The new engine will be called the Greene-Wheelock.

Hoadley Bros.' connection with the enterprise has given rise to the report that some important electrical deals are on the tapis. The new company has several contracts that must be filled by the middle of summer, so that the present works, which are supplied with the best class of machinery, will be run to their capacity. As soon as the new shops are erected so that work can be done in them, the present shops will be overhauled and fitted up with improved and expensive machinery. Hoadley Bros. will continue their old business, the only difference being that they will be in the east much of the time.

SHAINWALD-BARNARD.

J. C. Shainwald was married recently to Miss Julia H. Barnard, of San Francisco, at the Auditorium hotel, Chicago. A number of relatives and intimate friends were present. After an extended tour of the northern lakes the couple will settle in Chicago, and Mr. Shainwald will push with renewed energy the affairs of the Standard Paint Company, of which he is western manager.

DROP FORGED TROLLEY EQUIPMENT.

In the March issue of the REVIEW was an article on drop forged overhead material which attracted a great deal of attention from electricians and specialists in street railway work. Not content with confining its efforts to the specialties shown in connection with the preceding article, that progressive concern, the Billings & Spencer Company, Hartford, Conn., is designing new devices which are being added to its general line as rapidly as practicable. In this connection is illustrated new insulators for trolley lines which are designed to provide an improved insulated support for carrying a trolley wire, the support being adapted to be assembled in the form of a straight line hanger, or in the form of either a double or single curve pull-off for maintaining the alignment of trolley construction.

Figure 1 is a sectional view of the straight line hanger showing the interior construction.

Figure 2, double pull-off assembled.

Figure 3, drop forged yoke for single pull-off. These fixtures can be furnished either rigid or interchangeable.

Figure 4, Standard stud insulated with "Colophite" with hexagon nut threaded either $\frac{5}{8}$ inch or $\frac{3}{4}$ inch long under hexagon head.

Figure 5, drop forged steel bare stud before being insulated.

Figure 6, drop forged bolts for adjustable strain.

Figure 7, adjustable strain assembled, showing the drop forged bolts, right and left, lock nut, aluminum bronze $1\frac{1}{8}$ inch hexagon sleeve insulated by attaching a "Colophite" ball strain, which, the manufacturer says, makes the strongest and best insulated strains made upon mechanical principles and high electrical resistance.

Figure 8 illustrates the preliminary operation of drop forging the Billings patent commutator segments, showing a cylindrical unalloyed copper rod shaped to the requisite length, heated to a malleable state. While in this condition it is subjected to the action of successive pairs of dies in a drop hammer. By the first pair of dies the so called operation of "breaking down," the rod is ready for subsequent forging and bending of arms to the required shape to fit any special commutator.

Figure 9 shows the first result of the "striking up" which produces a bar in an unfinished state to conform to the specified type. The bar is then treated with acid for the purpose of removing oxide. When cold the flashed edges on the bar are trimmed in the usual manner and then the bars subjected to a hardening process and each bar is tempered uniformly, thereby giving them all an even and durable wearing surface.

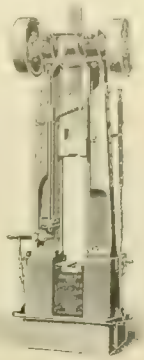
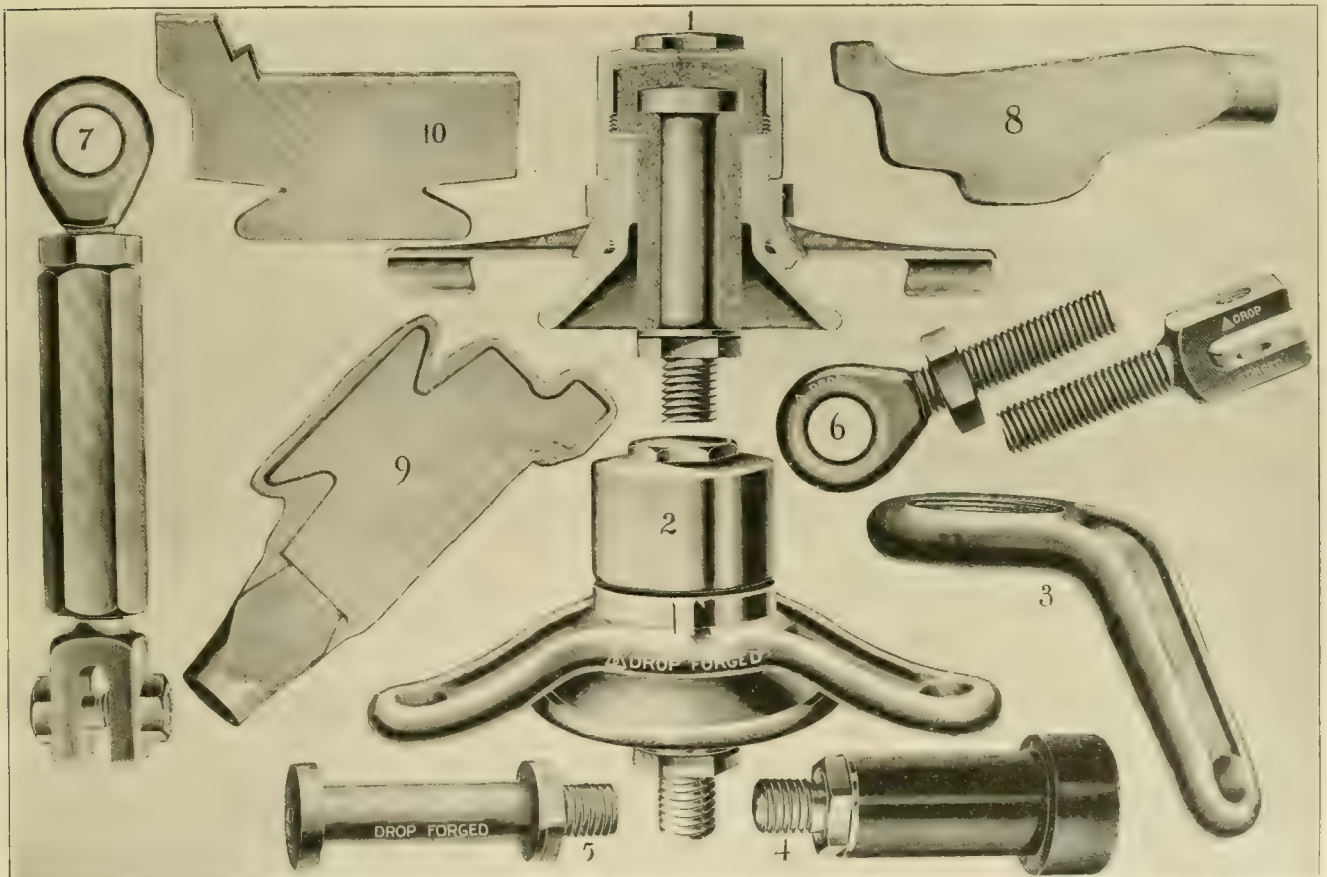


FIG. 12.



DROPPED FORGED TROLLEY EQUIPMENT.

Figure 10 shows a finished bar ready for the No. 12 Westinghouse commutator. The most important feature of the bar lies in its being formed in one solid piece wrought from a single rod by the process of drop forging. It has the grain or fiber of the material

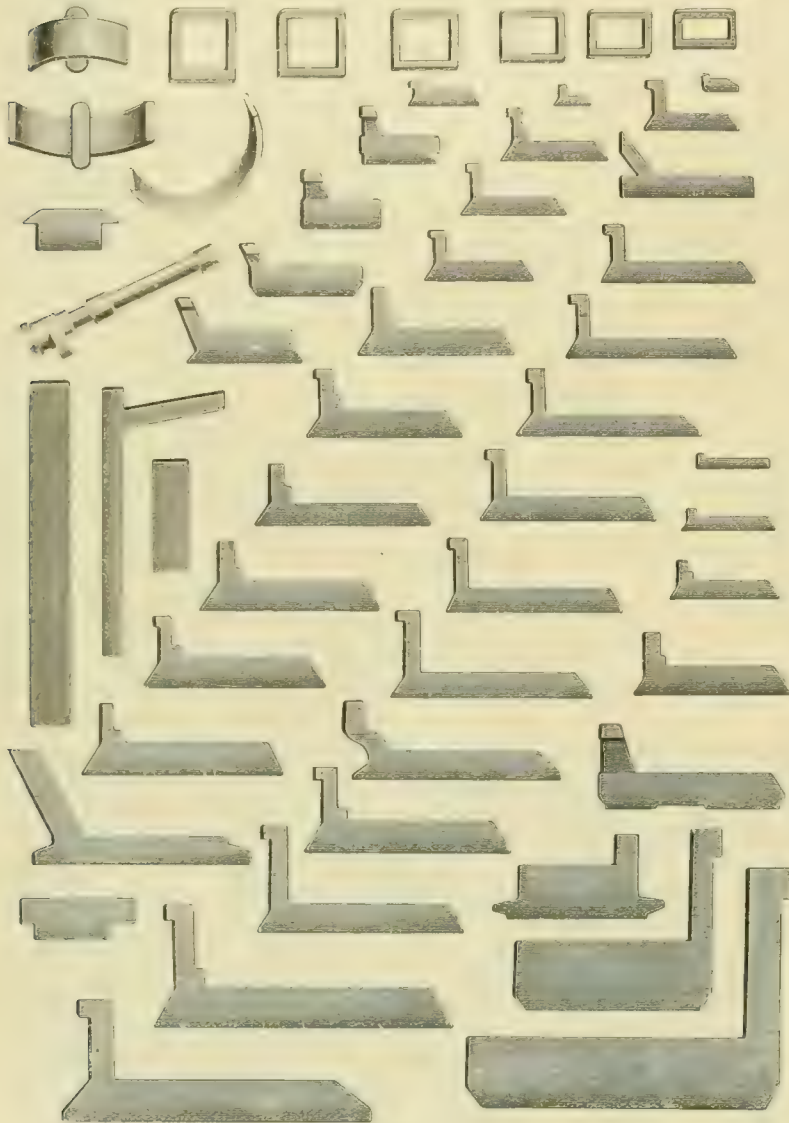


FIG. 10.

always parallel to the outline of the commutator bar, no matter what shape the same may be bent to and still be one metal.

The successful adaptation of drop forged commutator segments by the Billings & Spencer Company, for electrical appliances, suggested the idea to Frank X. Cicott, the advantages of producing wrought metal as a substitute for ordinary brass castings in the manufacture and construction of overhead trolley equipment, using "Colophite" insulation. The Billings & Spencer Company has prepared a line which is now being offered with marvelous success to the electric railways for spring and summer renewals and extensions. A series of electrical tests have been made of the "Colophite" insulation of the drop forged trolley material showing a resistance of 337,000 megohms.

Figure 11 shows a large variety of drop forged commutator segments made by the Billings & Spencer Company.

Figure 12 illustrates the drop hammer employed for this work. This machine is also manufactured by the Billings & Spencer Company. The Central Electric Company, 173 and 175 Adams street, Chicago, has secured the western agency for these specialties.

BONUS FOR BOILERS.

When the Government orders a new cruiser, it has become a settled thing to base the price on the test and scale the bonus in proportion to the excess of builder's guarantee.

The Heine boiler people, St. Louis, are at present justly elated over the earning of \$1,500 bonus money, as a result of test of the battery of 12 boilers they installed for the Edison Illuminating Light Company, St. Louis. The Heine guarantee was to evaporate with straight grates and plain setting 8 pounds of water from and at 212° Fah. per pound Illinois coal, having a heat value of 11,500 b. t. u. per pound; and an evaporation of 7 pounds water per hour per square foot heating surface (equal to 64.2 per cent above rating) with less than 1 per cent entrainment. This in the face of the fact that Heine boilers have 25 per cent less heating surface than is claimed necessary by other boiler builders.

The results of the test showed on economy test a run of 26 per cent above rating, evaporating 8.335 pounds of water from Illinois fuel of 11,481 b. t. u., or an equivalent of 70.13 per cent efficiency. The capacity test showed 7.258 pounds water per hour per square foot heating surface, equal to 70.3 per cent above rating, with only $\frac{8.4}{100}$ of 1 per cent entrainment. All of which was highly pleasing to the makers of the boilers who earned an extra \$1,500, and no less so to the purchasers who will operate an unusually economical plant.

GEORGE M. PHELPS.

One of the best known workers in electrical journalism died at New York recently, George M. Phelps, president of the Electrical Engineer. Mr. Phelps was born at Troy, in 1843, where he received a high school education. His electrical knowledge was acquired in the shops of the American Telegraph Company and Western Union Company. Resigning as superintendent of the New York factory, in 1885, he joined Franklin L. Pope in the conduct of the Electrical Engineer. For nine years he served as treasurer of the American Institute of Electrical Engineers.



C. H. Walsh has assumed the active management of the Burlington, Ia., Electric Railway.

J. C. Liggett, electrician of the Detroit Citizens Street Railway, has resigned to give his attention to electric roads in Indiana.

Arthur S. Partridge, of St. Louis, who supplies the wants of street railway men of the southwest, made the REVIEW a pleasant visit.

Henry G. Issertel, the well-known electrical engineer of the H. W. Johns Manufacturing Company, New York, spent two weeks in Chicago.

H. H. Vreeland, president of the Metropolitan Street Railway, New York, came all the way to Chicago to inspect the Metropolitan Elevated.

John Walker, general manager of Fraser & Chalmers (inc.), has been elected a director of the company as a reward for his long, faithful and valuable services.

Ralph L. Shainwald, president of the Standard Paint Company, New York, manufacturers of the well known P. & B. insulating compound, called while in the city.

M. E. Thompson, of the J. E. McEwen Manufacturing Company, Ridgway, Pa., has been in Chicago for two weeks superintending the installation of the plant for A. M. Rothschild & Co.

E. J. Wessels, general manager of the Genett Air Brake Company, New York, will sail for Europe in June, in the interest of his company's export business, which is increasing rapidly.

Charles M. Parker, of St. Louis, has been elected president of the Metropolitan Electric Railway Company of Springfield, Mo. Seth Barham, has been promoted to be superintendent.

H. E. Heller, formerly connected with the Buffalo, Kenmore & Tonawanda Street Railway, has been appointed superintendent of the proposed Lewiston, N. Y., Electric Railway.

C. D. Jones has resigned the superintendency of the Burlington, Ia., Electric Railway, and has removed to Memphis, Tenn., where his brother, Frank G. Jones, is President of the City & Suburban Railway Company.

H. M. Littell has resigned as general manager of the New Orleans Traction Company, to take effect in July. It is reported he will go to one of the Brooklyn roads. Under Mr. Littell's administration electric traction was adopted by the Orleans Traction Company, which has a fine system.

Charles C. Upham, general manager of the Lincoln Street Railway Company, Lincoln Neb., found his way to this office on his way to New York. He says it looks as if the road would soon be out of the hands of the receiver.

G. W. Marsh, general manager of the Standard Underground Cable Company, Pittsburg, stopped off in Chicago on his way to the Pacific coast. Mr. Marsh says the company is busy on several important contracts in that section.

Raphael Semmes, manager of the Mobile, Ala., Street Railway Company, is suffering from an illness that confines him to his bed, much to the concern of his numerous friends, who hope he will be speedily restored to his usual health.

G. W. Simonds, president and treasurer of the Simonds Manufacturing Company, Pittsburg, died on April 9, and was buried April 11, in Albany. It is with sorrow that his friends of the trade will learn of the sad loss of their business associate.

R. E. Daniels, of the Daniels Steel Railroad Tie Company, Youngstown, O., recently made the REVIEW a pleasant call. Mr. Daniels says the company is quite busy with orders, but has facilities for turning out large quantities of its specialty.

Frank X. Cicott, of Pettingell-Andrews Company, agents for Billings & Spencer, was in Chicago last week with a long string of good orders gathered on his trip west. The new drop forged materials have been received with great favor, and the factory at Hartford is running night and day in consequence.

W. R. Garton, of the Central Electric Company, has returned from Hartford, where he investigated the manufacture of the Billings & Spencer Company drop forged overhead material, which the Central Electric Company will supply to the western trade. He reports a busy time there, and a large demand for these specialties.

Arthur H. Woodward, of this city, has become treasurer of the International Register Company and will take an active part in the management of the concern. Mr. Woodward is well known in Chicago society, and brings to his new work a valuable experience in mechanical lines, being a graduate of both the Chicago Manual Training School, and Cornell.

Warren S. Blauvelt, who has had several years' experience in the street railway business, east and west, has severed his connection with the Great Falls Street Railway Company, of Great Falls, Mont., where he has been for three years. Mr. Blauvelt expects to engage with some eastern railway company, and in the meantime is staying in Chicago.



CHARLES F. FOSTER.

Charles F. Foster, of Chicago, late mechanical engineer for the Columbian Exposition, has been appointed mechanical and electrical engineer for the southern exhibition to be held in Atlanta, Ga., this fall. Mr. Foster entered upon his duties April 1. Mr. Foster is a graduate of an eastern mechanical school, and prior to his life in the west was assistant engineer to the city of Boston. He came west to manage some big cotton manufacturing mills, and was later general manager and vice-president of the Heine Safety Boiler Company.

W. D. Allison has resigned the superintendency of the Fort Clark road at Peoria. During the two years that he has been in charge there the property has been greatly improved and the operating expenses materially lessened. The expense from accidents during that time was less than \$100. He was a great favorite with the employees who at the time of his resignation presented him with a gold headed cane and gold headed umbrella. His Peoria friends and employees regret very much to lose him but we feel sure he will make equally warm friends with whatever road he is connected in the future.

William Taylor, formerly of the Electrical Supply Company, and more recently of the firm of Taylor, Dee & Mack, Chicago, has removed to New York, where he has taken a responsible position in the business office of the Electrical World. His acquaintance with those

engaged in electrical industries should render his services of value to that journal.

SUCCEEDS MR. RICHARDSON.

At a meeting of the executive committee of the American Street Railway Association, May 15, Col. John N. Partridge, president of the Brooklyn City & Newton Railroad Company, was appointed temporarily to succeed Mr. Richardson without salary. The office will be in charge of the old assistant.

DUFFY-CUNNINGHAM.

C. Nesbit Duffy, the able secretary and treasurer of the Cass Avenue & Fair Grounds Railway Company, St. Louis, was married May 7, to Alice M. Cunningham. The ceremony took place at 5 o'clock, in St. Alphonsus church, St. Louis, and was witnessed by a large gathering of the friends of both the contracting parties. Mr. Duffy's many friends in the street railway fraternity wish him many joyous years of wedded bliss, and trust he may celebrate his golden wedding. Mrs. Duffy was the recipient of many costly presents.

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F. S. KENFIELD, Business Manager.

CORRESPONDENCE.

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

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THE breaking of iron or steel electric railway poles is an extremely rare occurrence but it is a very annoying one, when it does happen. It would be well in construction work to be sure that the span wires are not strong enough to break the poles, so that poles can never come down in the street.

ANY street railway companies that do not have facilities for their conductors and motormen to slick up between trips, are way behind the times. Passengers do not like to see a dirty hand extended to them for fare, especially if they happen to be clean themselves. Clean water, towels and soap do not cost much, and should be supplied in sufficient quantities to enable employees to keep clean. They can do better work clean than dirty.

SOME people are never satisfied. It was only a few weeks ago that the Brooklyn daily papers were yawping because the Brooklyn trolley cars were running too fast, and requested a reduction of speed. When the street railway managers adopted their suggestion and ordered motormen to run at the rate of six miles an hour, the papers were unanimous in complaining that the cars were running too slow, and are still finding fault. They would even complain if the cars were not run at all. So there is no way to suit them, and managers would better act upon the lessons learned by years of experience in operating their lines and suit themselves.

GENERAL MANAGER WYMAN, of Milwaukee, has been publishing for the past few months, a monthly bulletin of eight pages, 9x11 inches, in which practical talks are addressed to employees. Heads of the mechanical and operating departments also avail themselves of this medium to call attention to repairs occasioned through carelessness or ignorance. In the June number considerable space is devoted to the wheel subject and a detailed explanation made of the causes which result in flats and broken flanges, with a statement of how brakes should be used to avoid skidding. There is also an interesting article on line repairs. The plan of thus reaching the whole force each month is a most commendable one, is meeting with deserved success, and is well worthy of being adopted on many other roads.

THE article in the May REVIEW describing the experience of one of the large roads in doing away with headlights on cars, has set a good many managers to thinking. There are unquestionably many roads on certain lines of which it might be unwise and perhaps unsafe to abolish the headlights. This particularly applies to interurbans, and tracks laid in outlying districts where street lights are few and far between. But on the other hand, there are hundreds of miles of road operating on brightly lighted streets where the headlight probably does more harm than good. Headlights are expensive, both in first cost and the labor necessary to keep them in order, and where oil is burned, amounts to considerable money in the course of the year. They are easily smashed or battered, and without good destination signs in the deck are no advantage to passengers.

WE print elsewhere the opinions of several prominent managers on the vestibule question, and more of the same kind will appear in the July issue. It may seem a little out of season to discuss this important question, but managers understand that it must be met and decided in this kind of weather, in order that cars may be equipped before winter, should a change be considered necessary. Conditions of climate have much to do with the decision, and the style of vestibule adopted may defeat the ends which it is desired to obtain. Many of the managers tell of their experience with various styles of vestibules, and they make interesting reading. The subject is thoroughly gone into, so that managers can find much information on both sides of the question. There seems to be a more favorable opinion of the good features of the vestibule than prevailed one year ago.

TEACHING motormen how to handle the controller has always been considered one of the most important points in his education, but it is beginning to appear, that the proper handling of the brake is almost as important from the financial side of the question, and very much more difficult. If the track was always dry, learning to brake a car would by no means be the difficult task it is now. It is the variable condition of the track that upsets a motorman's calculations. It requires a man of natural

ability and a good deal of experience to handle a car on a slippery track with a close schedule, and not lock the wheels and flat them. This is true both of hand and mechanical power brakes, though with the latter it is much easier to avoid flat wheels because the brakes are so easy to apply and release. The only apparent way out of the difficulty is to educate motormen in the use of the brake, and such education is absolutely necessary to prevent an excessive number of flat wheels.

PROF. FRANK PARSONS may know where he is at while he remains within the austere limits of the Boston University Law school, but gets away out beyond his depth when he aspires to such work-a-day topics as street railways. This gentleman in the May Arena tries to prove to his own satisfaction that the city of Boston by municipalization of the road can give a better service and accommodations for two cents than is now offered by the West End road for five cents. It may figure out in pretty tables on the fair pages of the Arena and in Parsons' mind, but no street railway man with even one sense, since the days of John Mason, has ever succeeded in juggling his pay roll, feed and fuel account down to a two-cent basis. It is folly and rank nonsense for any body to talk about Boston, or any other city in this country, furnishing for two cents per passenger the service and equipment which make our intramural transportation the greatest wonder of visiting foreigners. We would like to have the aforesaid Parsons put in charge of a road just to show how sudden the two-cent fare bubble would collapse.

THE question of a deposit from conductors to protect the company against loss either from the careless or dishonest handling of the moneys collected, has given managers more or less trouble; although there are few roads of any importance where some such system is not employed. In most cases it is also required of drivers or motormen and has a most salutary effect in making a man more cautious, and less likely to take chances on running into vehicles. The plan, however, involves considerable work and has some objections. The Brooklyn Heights road now requires its conductors to furnish a \$150 bond from a guarantee company at a cost of \$2 per man per year. This is along the line of what universally prevails in banks, express companies, railroads and a fast increasing number of corporations. The requirement is in no respect unreasonable, and an employe with honest intentions and methods cannot take exceptions to the plan. It is no reflection upon the integrity of a bank cashier or county treasurer that he must give heavy bonds before assuming his duties, and the comparison is none the less true because a small bond is required of the man handling only a few dollars daily.

ALTHOUGH there has been much talk within the past five years of transmitting current for long lines of railway, very little progress has been made in the actual carrying out of such projects. Very few attempts have

been made to use anything but the common 500-volt direct current, and ten miles is about as far as most inter-urban companies care to transmit from one power plant. The situation seems to be this: The majority of roads must depend on steam power. No commercial electrical apparatus has yet been offered which does not involve the use of rotary transformers or motor dynamos in transmitting power for railway purposes. The cost of installing and maintaining these rotary transformers, together with the cost of transmitting and sometimes transforming power for them, makes it cheaper to build steam plants at points along the line rather than transmit at high voltages from a central station, except it be a water power plant. Unless, then, a road can afford to erect power plants along its route at intervals and use the ordinary 500-volt direct current transmission, it can not afford to build a longer line than can be supplied economically from one central station. When the manufacturers can offer an alternating current railway motor for use on interurban lines the condition of affairs will be changed, but just at present the practical railroad operator has nothing available but the ordinary 500-volt power plant.

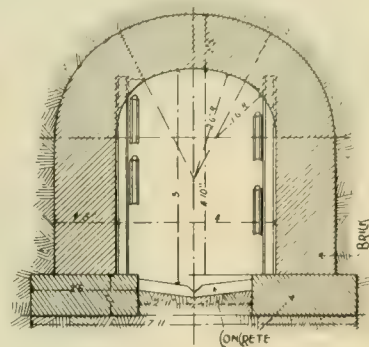
A LARGE proportion of the accidents reported on electric lines seem to be persons struck by a car moving in opposite direction to the car the passenger has just left, or behind which the injured party was walking in crossing the street, and failing to observe the approach of the other car, while the courts generally recognize to a very gratifying extent the fact of contributory negligence on the part of a plaintiff so injured and insist that reasonable precaution is not exercised, unless the public before crossing a track first look to see if a car is approaching; it is a fact that many roads fail to enforce as much care on the part of the motormen as they should do. We have repeatedly ridden on cars which passed a car on another track which was discharging or taking on passengers, at a rate of speed which made it absolutely impossible to have stopped the moving car in time to avert an accident had a person chanced to step upon the second track from behind the other car. All legal rights aside, it is an evidence of very poor management to allow motormen to take such risks. The time lost in running very slowly by another car at rest, is a mere trifle, and by shortening the laying time at end of route one or two minutes, would easily maintain the same schedule. We have seen a motorman run his car over crossings at a positively dangerous speed, for a distance of a mile or more, and then settle down for a good rest and a quiet smoke at end of line. Since there are no tired horses to rest each half trip there are few routes where there is any good reason for long waits at termini. Keep the cars moving; they earn no money laying at ends of routes.

THE adoption of platform gates controlled by the motorman at Minneapolis and St. Paul has resulted in reducing the number of accidents 30 per cent, and the management considers the plan a great success.

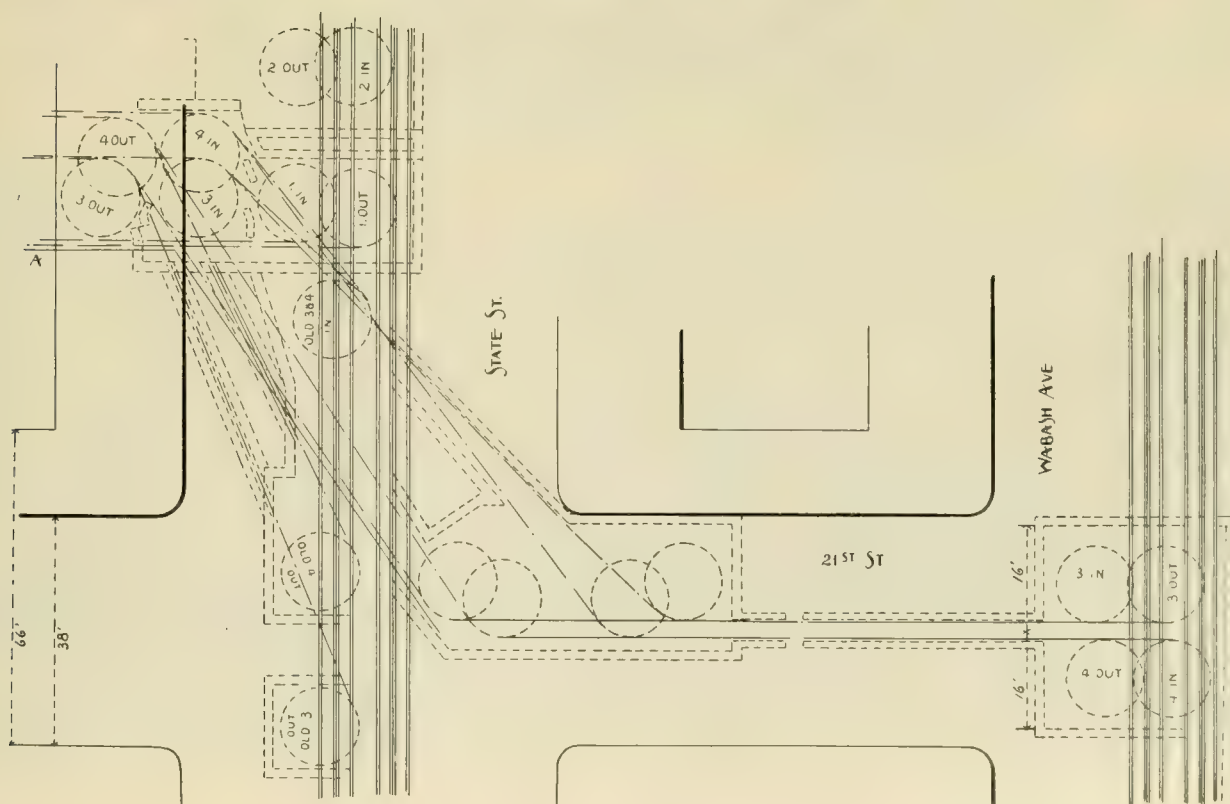
TWENTY-FIRST STREET CABLE TUNNEL AT CHICAGO.

One of the important engineering works undertaken this year by the Chicago City Railway, is the Twenty-first street tunnel for the accommodation of the two cables, operating the Wabash and Cottage Grove avenue line. The cable power house at State and Twenty-first streets is a block away from Wabash avenue. Ever

since the road was installed the cables have been led a circuitous route by way of Twenty-second street, to drive this line. When the new tunnel is completed the two cables running north and south will be led by a route as direct as possible from the power house to Wabash avenue. The change will do away with the auxiliary cable used on Twenty-second street, between Wabash and Cottage Grove avenues, and will shorten the length of the Wabash avenue cable. The conduit is 5 feet high



and 4 feet wide. The walls are cement laid concrete and the foundation and floor concrete. At the vaults, the street is supported on steel I beams resting on cast iron columns. It is now nearly ready to go into commission and will be a great improvement over the present small and round about affair.





VIEWS OF WEST END.—NEW ORLEANS.

**NEW ORLEANS GREAT PLEASURE
RESORT.**

No visitor has seen New Orleans until he has taken a street car on Canal street, in the very heart of the city, and by a delightful ride which changes from business blocks

shore of Lake Pontchartrain, at a point where the canal enters the bay.

This canal formerly served as the great dividing line for the two quarters of the city, and was afterward filled in for a distance of two miles to form the main business thoroughfare of the city, the Broadway of New Orleans.



LAKESIDE TERMINUS,—WEST END.

to suburban scenery, been whirled out to the great "West End." This famous resort, where the great and small of the delta city gather in afternoons and evenings, is situated on made land and thousands of piles, on the

Now the canal is turned in another direction to reach the railroad yards, and where sluggish boats used to drag their toilsome voyages, electric cars of the most approved pattern fly by day and night.



PAVILION, WEST END—NEW ORLEANS.

As the cars turn from Canal street they follow along the canal and many are the picturesque glimpses afforded the passengers of tow-path marine, as the boats glide along under the welcome shade of live oak and magnolia,

The West End is famous among the pleasure resorts of the country, and doubtless is the largest and most expensive one operated by a street railway company; for the West End is the property of the New Orleans Traction Company.

About one year ago a disastrous fire swept the resort practically out of existence. The site was saved, though not all of that, as hundreds of the piles burned to the waters edge. General Manager H. M. Littell, however, lost no time in making plans and contracts for rebuilding on even a larger scale than before, and the resort was again thrown open to a delighted public last month. The buildings are commodious and equipped with all the modern conveniences which go to make up a first class resort. The promenade which is over the water and extends from the auditorium to the cafe, is 400 feet long by 400 feet wide, and here are seats for several thousand. Operas, concerts, band concerts and other amusements are given nightly during the season which lasts from May to October. In the cafe, the dainties of well known southern chefs are to be had, or may be served out doors on tables scattered for that purpose. There is plenty to eat and drink, and when one is weary of the music and feasting a longer promenade extending on a mole fully a half mile out into the bay invites one to stroll along its graveled walks, shaded by the many varieties of luxuriant southern foliage, and bordered by beautiful hedges. At night electric lights are everywhere and seats at every convenient spot. Indoor amusements are also in abundance, and finely equipped bathing houses tempt to a plunge in the salty waters of the lake. The resort is at once a credit to the road and to the city, and the completeness which has marked its resurrection from total ruin, under the direction of Mr. Littell is highly complimentary to his energy and good judgment. Our illustrations will give the reader a very fair idea of the design of the buildings, but cannot do justice to their attractive appearance or generous dimensions.

JULY MEETING NORTHWESTERN ELECTRICAL ASSOCIATION.

The summer convention of the Northwestern Electrical Association will be held in Chicago July 17, 18 and 19. The committee on arrangements and entertainment consists of S. F. B. Morse, Charles E. Gregory, John Valentine, A. C. Bunce and J. W. Wolff. The Leland Hotel has been selected as headquarters, and an interesting and profitable program is being arranged. Papers will be read and discussed at the morning sessions, while the afternoons and evenings will be given up to recreation. Prof. D. C. Jackson, Madison University, will read a paper on "The choice of transformers, and the advantage to be derived by testing every transformer before placing it on the line."

HAMILTON FREIGHT SERVICE.

Given rails laid through a productive territory, powerhouse completed and machinery doing its work, cars ready to run—all this seems play to the job of getting out a tariff for freight and express service. No manager who tackles it, but would rather build forty roads than be compelled to complete his new task. It never leaves his mind, the figures in their many combinations dance before him even in his sleep, so that he fails to obtain the rest he should have. Managers who have been through the

Hamilton, Grimsby and Beamsville Electric Railway

Sir,

We beg to call your attention to the fact that we are now prepared to carry Freight and Parcels between Hamilton and Stoney Creek, Winona, Grimsby and Beamsville, and stage to Smithville, at very reasonable rates.

Freight will be called for, and delivered along the line twice daily, and Parcel delivery on every alternate train.

We therefore solicit your patronage and promise every attention and prompt delivery to all goods consigned by our line.

When you have goods to ship, telephone 1200. and we will send for them. Keep us in mind and give us your support.

A. J. NELLES.

Manager

mill will never forget the awful experience. A. J. Nelles, manager of the Hamilton, Grimsby and Beamsville Electric Railway Company, Hamilton, Ont., is just coming out of the incubator.

The road from Hamilton to Grimsby is 18 miles long, of both girder and T rail, having a power house at Stoney Creek 7 miles from Hamilton. The road bed is only partly ballasted but stood the winter in good shape. The equipment consists of three passenger cars 30 feet long, mounted on McGuire double trucks with 30-horse-power Westinghouse motors; one combination car, one small car, three open trailers, and three freight cars, with one large freight car motored for freight business.

The road opened for business on October 18, 1894, and has been running for seven months including one of

the severest winters ever experienced, being very cold and a large fall of snow which drifted very badly. With the exception of one very stormy Sunday when the company did not attempt to run, it has not missed a half dozen trips since the opening. Some days as high as thirty-two cars a day were run. The company has no

beginning to over 200 tons of miscellaneous freight a month. The company started with one can of milk and now brings in about 35 cans daily. The cars also carry the mails, giving four services daily.

The tariff is compiled in this way. The line is divided into six sections of about three miles each, and the rates

Hamilton, Grimsby & Beamsville ELECTRIC RAILWAY.

Hamilton, _____ 189

RECEIVED from _____
the undermentioned property in apparent good order,
addressed to _____

PARCELS AND GOODS TAKEN FROM STORE AND DELIVERED TO RESIDENCES
IN HAMILTON PROMPTLY.

No. of Packages and Species of Goods	Marks	Weight, Lbs.	Back Charges

SPECIAL NOTICE

Please give marks and weights. We will in no case be responsible for overcharges when the correct weight is not mentioned in this receipt.
All goods at shipper's or consignee's risk, not responsible for leakage, breakage, fire, pilage or rust.

Hamilton, Grimsby & Beamsville ELECTRIC RAILWAY.

Hamilton, _____ 189

The Hamilton, Grimsby and Beamsville Electric Railway
Co. will please receive undermentioned property in apparent
good order, addressed to _____

PARCELS AND GOODS TAKEN FROM STORE AND DELIVERED TO RESIDENCES
IN HAMILTON PROMPTLY.

No. of Packages and Species of Goods	Marks	Weight, Lbs.	Back Charges

SPECIAL NOTICE

Please give marks and weights. We will in no case be responsible for overcharges when the correct weight is not mentioned in this receipt.
All goods at shipper's or consignee's risk, not responsible for leakage, breakage, fire, pilage or rust.

DAILY MILK WAY BILL.

Received at Hamilton, _____

Conductor _____

SHIPPER _____

No. of Cans _____

Hamilton, Grimsby & Beamsville Electric Railway

P. NO. _____

FREIGHT WAY BILL.

Freight Left _____

Freight Arrived _____

Hamilton, Ont. _____

189

W. B. NO.	FROM	TO	NO. AND DESCRIPTION OF PACKAGES	WEIGHT	RATE	OUR CHARGES	ADVANCE CHARGES	PREPAID	COLLECT	REMARKS

First Class	STATION TO	From	From	STATION TO	First Class
1	Hamilton	0	0	Hamilton	5
5	Beamsville	0	0	Beamsville	10
10	Red Hill	0	0	Red Hill	15
15	Stoney Creek	0	0	Stoney Creek	20
20	Brantford	0	0	Brantford	25
25	Smith's	0	0	Smith's	30
30	Winona	0	0	Winona	35
35	Chino	0	0	Chino	40
40	Grimsby	0	0	Grimsby	45
45	TICKET No.	TICKET No.	TICKET No.	TICKET No.	50
50	HALF FARE	HALF FARE	HALF FARE	HALF FARE	55
55	ROUND TRIP	ROUND TRIP	ROUND TRIP	ROUND TRIP	60
60	MONTH	MONTH	MONTH	MONTH	65
65	1 3 2 2 1	3 4 5 6 7	7 8 5 4 3 2 1	4 1 2 2 3 1	70
70	5 8 7 8 0 0	8 9 10 11 12	12 11 10 9 8 0 0	9 7 8 5	75

BLANKS USED BY HAMILTON, GRIMSBY & BEAMSVILLE ELECTRIC RAILWAY COMPANY, FOR ITS FREIGHT TRAFFIC.

Hamilton, Grimsby & Beamsville Electric Railway.

CONDUCTOR'S WAY BILL.

1895

Conductor _____

FROM	TO	No.	ARTICLE

Hamilton, Grimsby & Beamsville ELECTRIC RAILWAY.

DAILY TICKET REPORT.

189

Conductor _____

DESTINATION	LOCAL	COMM.	COLLECT	FARE	ADULT

snow appliances whatever, with the exception of small scrapers upon two cars. Eleven round trips are made daily. The passenger business at first was rather more than it could handle, caused no doubt by the novelty of the thing, but since January there has been a steady increase to from 12,000 to 15,000 passengers per month. The freight also is daily increasing from a very small

to and from those points are made similar to stations. Cars stop at any part of the line to take on or let off passengers and freight. Single return and commutation tickets are sold and there is a rate for working men and school children of which there are a great many.

There is also issued a 1000-mile ticket at \$10 which is very popular. The line is miled off and the conductor

detaches one coupon for each mile traveled, but in no case less than five coupons for any ride. This ticket can be used each way and between any two points and suits patrons.

Regarding freight service Mr. Nelles says: "We have a freight tariff with rates between all points, and bill goods as per classification used by steam roads, and our rates compare with steam roads for similar distances.



A. J. NELLES.

We have yet to try the fruit business, but have arrangements about complete for establishing a fruit market in Hamilton, when the fruit will be brought in over our road and sold to dealers and consumers. We have also a connection with the boat lines, with which we receive and dispatch freight to and from Toronto and Montreal over our line. When the fruit begins to move we will make several trips per day

with our freight car, picking up and delivering freight to and from any place upon the line, and as most of the orchards and vineyards lie along our line we can handle the fruit from each grower with little or no teaming, running our cars into the market and to the boats direct. This is our present system and these are our hopes. If our future fulfills our expectations as the past has exceeded our anticipations, the success of the undertaking is assured."

We illustrate several of the blanks used by the company. Unfortunately, for our purposes, the tickets are printed on colored stock, which cannot be photographed. The first illustration is a reproduction of the circular that brings business to the road. The conductor's way bill is for freight picked up in transit and not entered at a station. The ticket report was compiled by Mr. Nelles.

The daily milk way bill is made up at the Hamilton office. The other blanks explain themselves.

A. J. Nelles was born upon the banks of the Grand river, in Haldimand county, Ontario, on a farm given to one of his forefathers by an old Indian chief. He is one of eight brothers, seven of whom hold prominent positions with railroad companies. Until he was 20 Mr. Nelles remained on the farm, and then went with the Grand Trunk as freight clerk, remaining with that company in various capacities for 22 years. He retired from the railway to the quieter occupation of running a large stock farm in which he invested considerable money. In 1881 he had a longing to engage again in the more active duties of railroading, so he accepted the position as manager of the B. W. and L. E. Ry., that was tendered to him by the directors, which he filled profitably for the road until it was bought by the T. H. & B. Co. In October, 1894, he was appointed manager of the Hamilton, Grimsby & Beamsville Electric Railway Company, which required a new and original mode of management.

LUDLOW LAGOON AT COVINGTON.

Nestled among the hills of the Ohio valley, but a short distance by electric railway from the cities of Cincinnati, Newport and Covington, is a pleasure resort which is claimed to be second to none in the country in the natural beauty of its surroundings, combined with a liberal expenditure of capital to make it comfortable and attractive. Ludlow Lagoon is the name of this resort and it is owned by the Ludlow Lagoon Company, an organization distinct from the Cincinnati, Covington and Newport Street Railway which runs to the grounds, but which has many prominent stockholders who are on the directory of the street railway. The resort is one well calculated to pay its owners handsomely as well as the company that furnishes the transportation to and from the grounds.

Ludlow Lagoon itself is a beautiful artificial lake, made by building a dam across one of the deep and heavily wooded ravines which abound along the Ohio river. The lake is long and narrow, being about 3 miles in circumference. The Ludlow Lagoon Company owns not only the lake but the land on each side and proposes to make the most of it for pleasure resort purposes. Much has been done already although the grounds were opened for the first time this spring. Twenty-five cents admission is charged. A dancing pavilion, scenic railway and refreshment pavilions have been built and free concerts and entertainments are given every night in an amphitheater built on a hillside. Rowboats, electric launches and bath houses are at hand and when the company has completed all its plans for drives and walks around the lake and up the sides of the ravine it will have a property to be proud of. The resort is liberally advertised and has a good patronage considering the short time it has been running. The lake is about 80 acres in extent and the surrounding land the same. Six islands are located in the lake and various novel attractions are planned for each. Liberal use of the electric light will be made at night in decorative effects. Every effort is made to keep away an objectionable class of people and cater to the respectable citizens of the cities to which it is adjacent.

On the back cover of its time table, the Cortland & Homer, N. Y., Traction Company advertises to furnish arc and incandescent lamps, fans and electric power. The time table is printed on yellow card board of vest pocket size and gives the time cars leave various points. The time of cars that connect with trains is indicated by heavy faced type.



THIS FENDER GUARANTEED TO FEND.

T. H. McLEAN EXPOSES THREE FRAUDS.

Thomas H. McLean, general manager of the Citizen's Street Railroad Company, Indianapolis, has saved his company \$1,500, and at the same time has done a great service for the street railroads of the country by exposing three Russian Jews, two of whom it is reported, have been making a living off the street railroad companies by fraudulent claims. The Freemans, who were written up in these columns a few months ago, are English Jews.

Between 9 and 10 o'clock on the night of April 25, Barney Ginsberg, alias Schwartz, and Yetta Bachak,



JOE STEIN.

BARNEY GINSBERG.

alias Ginsberg, with a child about three years old boarded a North Pennsylvania street car. A short time afterward Joe Stein got on the car, remaining on the rear platform. Ginsberg and the woman remained on the car until everyone else had left it except themselves and Stein. At the corner of Talbott avenue and Seventh street Ginsberg signalled for the car to stop, and taking the child in his arms, he left the car followed by the woman. After she had safely alighted and almost reached the sidewalk, Ginsberg being several feet ahead, and after the conductor had signalled for the car to proceed, the woman was seen to gradually sink to the ground, as if she had fainted. The man did not seem to pay any attention to her, so the conductor stopped the car and hurried to her assistance. He asked her if she was hurt, but she seemed not to understand English. She arose without assistance, and did not seem to be injured. The conductor took the names of the man and the woman and when he returned to the car secured that of Stein, who remained on the platform and apparently did not know the persons who had left the car. The conductor in his report to the company stated that Ginsberg made no attempt to get the name of any witness.

On the following Saturday Ginsberg made his appearance at the offices of the company, and saw Mr. McLean. He said his wife had been severely injured as the car had started before she reached the ground and she was thrown to the pavement. He offered to settle for \$1,500. Mr. McLean sent a representative of the company to investigate, who found the woman in bed with her arm so tightly bandaged that the circulation of the blood had

nearly stopped, but aside from that she was uninjured. Ginsberg said he had called in Dr. L. Witt, also a Russian Jew, who dressed the arm. The doctor said the arm had been badly bruised, and that as the woman was about to become a mother at the time, her condition was dangerous.

The company sent three physicians to make an examination of the woman, who reported that they found her in perfect health, and her arm was not even strained. This report strengthened Mr. McLean's suspicions that an attempt was being made to defraud the company and he determined to play with the conspirators. Next time he called, Mr. McLean asked Ginsberg, if he had any witnesses who saw the accident, to which he replied he had Joe Stein. Mr. McLean asked him if he had known Stein long, and Ginsberg said he had never seen him before the accident occurred.

"You didn't speak to him that night?" asked Mr. McLean.

"No, sir," replied Ginsberg.

"Then how did you find out his name?" continued Mr. McLean, and Ginsberg saw he was trapped and made the following explanation which is taken from his affidavit:

"The way I got acquainted with Mr. Stein was, while on my way on South Capitol avenue to the doctor's office, he met me and said, 'Excuse me, gentleman, for asking you, but how is your wife?' I said, 'How did you know about my wife?' He says, 'I was on the car when she fell down.' I asked him if he would not please give me his residence and he gave it to me. He was on the car that night. I did not know him then. The first time I knew him was when he stopped me. He said his name was Joe Stein."

A subsequent investigation disclosed that Ginsberg was married at the city hall in New York City 14 years ago. He left his family in 1893 and went to St. Louis, where until recently he is reported to have been living with a woman. Stein is also a resident of St. Louis, but it is not known when the partnership alleged between him and Ginsberg was formed. It is claimed that Stein has swindled street railways in St. Louis, New York and Chicago by getting hurt himself or having a pretended wife to be injured in a similar way to the case in hand, which is believed to be one of a series of raids contemplated in the large cities.

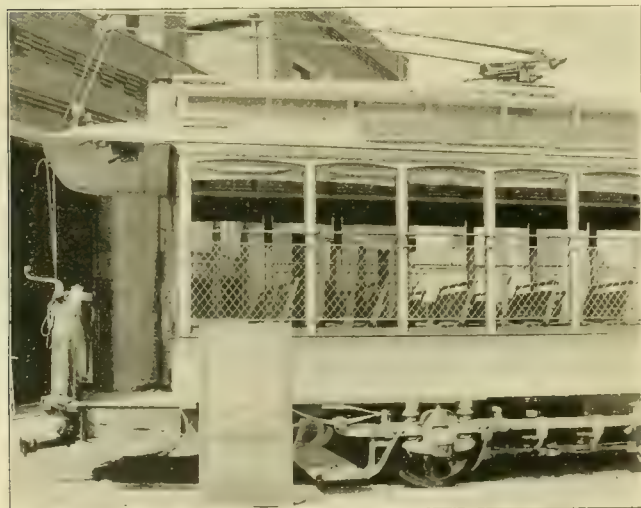
While this information was being secured Ginsberg offered to settle for \$600, and Mr. McLean determined to arrest the entire outfit. The men came to close the deal and were placed under arrest. Later in the day the woman was arrested, her arm suddenly becoming well as the officers read the warrant. She has made a confession. She gave her name as Mrs. Bønschaft, wife of Joseph Bønschaft, St. Louis, from whom she says she is divorced. The child belonged to Bønschaft. Since securing the divorce she has lived with her father at Quincy, Ill., where she was living when she met Ginsberg. She was induced to accompany him on promise of marriage, but he did not keep his agreement. In his affidavit Ginsberg said he had been married to the woman for five years. In her affidavit she gave her name as Yetta

Ginsberg, and said she had been married to Ginsberg nearly four years. Stein in his affidavit corroborates Ginsberg's statement of the meeting, in which the latter secured his name and residence, and says he never saw him before. The Citizens' Company believes it has evidence enough to convict all three of perjury, but will not prosecute the woman as she will be used as a witness.

Through the kindness of Mr. McLean the REVIEW is able to show the likenesses of Joe Stein and Barney Ginsberg. Perhaps their likenesses may be recognized by some members of the fraternity, and if preserved may come in handy some time.

CONVERTIBLE CARS AT COVINGTON.

In consideration of the increasing interest that is being taken in convertible cars which do away with the semi-annual change of trucks from closed to open car bodies and back again, we show herewith an engraving of one of a number of convertible cars used on the South Covington & Cincinnati Street Railway, of which G. J. Smith is master mechanic. These cars were originally bought of the Brownell Car Company for open cars. As all the cars of this road cross bridges which are so narrow that foot boards cannot be used, it is necessary to close the sides of all open cars with netting so that no



CONVERTIBLE CAR—COVINGTON, KY.

one can be injured while crossing these bridges. Hence all open cars must be entered from the platforms.

Furthermore it was found desirable to close the space below the level of the seats as a passenger would occasionally be injured by sticking his foot out too far when the car was on a bridge. This lot of cars was therefore ordered with a center aisle, wire netting along both sides and the bottom of the body closed. They were as said before, intended only for summer cars. Last winter Mr. Smith changed them to closed cars by simply putting in a sash containing two panes of glass between the cleats which guide the roller curtains in summer.

The small pane of glass at the bottom is considered better than a wood panel which would need to be painted and varnished frequently, and it has been found that there is practically no breakage among these small panes. Putting in the sash in this way makes a very tight car, and in spite of the increased glass area, less current is required to keep it warm in winter than for the regular closed cars. The windows of course, cannot be opened, but there are not many times in actual practice during the closed car season that it is desirable to have the windows open. It takes about four hours to change from closed to open. This is of course, much less time than it takes on most roads to change from a closed to an open car body.

These cars are 28 feet long over all, with 4 foot platforms. Width at the sills is $6\frac{1}{2}$ feet. The seats are $2\frac{1}{2}$ feet wide and the aisle $1\frac{1}{2}$ feet.

A number of similar cars have been ordered for the Columbus Central Railway, of which J. J. Shipherd is also president.

Convertible cars built on this plan do not have the objectionable features that could have been formerly urged against them. In these days of high speeds it is becoming more and more the custom to put netting along the sides of open cars and make passengers leave at the platforms. To roads that are willing to adopt this kind of open car the convertible car problem is easily solved in the manner here indicated. The Oakwood Street Railway at Dayton, O., has just had some cars built on a somewhat similar plan, which were illustrated in our last issue.

TRUE STORY ON A TRUCK SALESMAN.

The master mechanic and the agent for a well known truck company were standing talking in the door of the car shops. Far down the road a car was approaching and the low joints of a vile track were tossing it about like a ship on troubled waters. Time and again its bow would dip until it seemed as if the car must certainly come to grief when it would right itself only to nearly drag its stern on the high paving blocks. "There," said the truck man, "just look at that car. That's awful. I wouldn't stand it. If I was running this road I would throw every one of those rotten trucks out and get something decent that would do away with all that tremendous oscillation." The car drew nearer and as the style of the truck became more apparent, the master mechanic turned to the astonished truckman and quietly remarked, "It's one of your own trucks." "That's so," said the wilted truckman, "I ought to have kept my mouth shut." Next time he was careful to see what make a truck was before condemning it.

A switch box located on a pole of a Brooklyn, N. Y. line, was selected as a place to build a nest by some sparrows recently. The straw and other materials they used made a heavy ground and traffic was delayed several hours before this unprecedented trouble was found and removed.

NEW AND HIGHLY EFFECTIVE METHOD OF REMOVING SNOW AND ICE FROM RAILS.

Since a time antedating the recollection of the oldest veteran, salt has been used for removing snow, sleet and ice from the rails. In the good old horse days, cars would jump the track and brakes prove useless, unless the rail was fairly clean; but with the advent of electricity an entirely new and vital feature was presented, namely the necessity for as perfect a contact as possible between wheel and rail. Various ice breaking devices for freeing the rail have been tried, but none proved as effective as the time honored salt, particularly on curves and switches. Salt as used to date has involved several marked disadvantages and great waste. First, unless kept in a perfectly dry storehouse, dampness would attack the pile, decreasing its strength and making it difficult to feed when put in the salt boxes. Then extra men had to ride on the salters to work the levers and poke the hopper to insure anything like a steady flow on the track. Objection was also freely made in many cities to the use of salt which formed in piles and spattering on vehicles injured the varnish. The great objection, however, was the difficulty and waste in its use.

For several years past not a few managers have studied the question of preparing a very strong brine and thus using the salt in liquid form. The theory was excellent, but in practice it is found impossible to avoid incrustation and deposits which gather on the sides and bottom of the tanks and quickly choke the pipes through which the brine is conducted to the rail.

Now the problem seems to have been completely solved by the Fitch Salt Company, of Bay City, Michigan, which for 15 years past has been supplying many thousand tons of salt each winter to street railways for track work. The repeated demands by managers for a brine in place of salt resulted in President Fitch making a series of experiments covering many months and which were at last successful in producing cheaply a method of compounding a highly concentrated clear salt liquor with specific gravity greatly in excess of water, and which is absolutely free from deposit or sediment, is no more expensive in first cost than salt, but can be applied with less trouble and expense, and is very much more economical in use; wastage being almost wholly saved. The basis of the Triple Chlorides, as President Fitch names the liquid, is natural salt water as pumped from his salt wells, with a mechanical and chemical treatment. It will not freeze even at 20° below zero and has an immediate action when applied, its penetrating effects being very much greater than dry salt or the brine formed from salt melting on track.

During the past winter the triple chlorides was used on several street railways with surprising and highly gratifying success and these roads are so thoroughly convinced of its superior advantages they have abandoned salt and will use the brine exclusively in future. The

method of its application will at once suggest itself to every manager. For curves, crossings and switches the brine is applied by the man whose duty it is to sweep these points, pouring the brine from a common sprinkling can with a small spout nose just as he uses water in summer. If much is used at any special points a barrel full can be set out in any convenient basement or vacant place, as the brine will not evaporate in cold weather. For main line tracks a small tank or keg can be set on the front platform and the brine fed to the rail by small iron pipes passing through the platform floor and reaching almost to the rails and discharging a stream from the size of a slate pencil up to any amount desirable; the flow being regulated by a cock. For very bad track and long distances the sprinkling car used during the summer is pressed into service, the sprinkler being removed or changed so as to discharge only upon the rails. This change can be made at a trifling expense and labor, and one tank car will "brine" the rails of 20 or 30 miles.

The brine is shipped from the works in 50 gallon barrels, 100 gallon drums; or for large consumers, in tank cars, from which it can be pumped with any ordinary pump or siphoned much quicker and cheaper than dry salt can be handled. To unload at the car house no labor is required, as it can discharge through a hose into the storage tank. For a storage, iron is preferable to wood, and any discarded worn out shell boiler will make a cheap and lasting reservoir and can be set out doors anywhere most convenient. The brine has less corroding effect on iron and copper bonds than salt, and the method will readily commend itself to managers. Further interesting data and details can be had by addressing Pres. Fitch, of the Fitch Salt Company, Bay City, Mich.

SURE TO GET A TROLLEY.

A richly dressed old lady came down the stairs on the Brooklyn side of the big bridge the other afternoon and turned toward Fulton street with a somewhat doubtful expression on her face, as if she were not quite sure which way she ought to go.

Seeing a policeman in the middle of the street, her face lighted up and she stepped over near to where he stood and said:

"Will you please tell me where I can get a Flatbush avenue trolley car?"

"Madam," said the guardian of the peace, politely, but with great earnestness, "if you stand still where you are now for about five seconds you will get one in the small of your back."

Work on the 12½ miles of track and equipments of the Bangor, Orono & Oldtown, Me., Street Railroad Company, has been completed by the Worcester Construction Company of Worcester, Mass.; and the latter is now laying 16½ miles of T rail, building power and car house and furnishing equipment for the Gloucester, Essex & Beverly Street Railway Company.

defects which would not otherwise be noticed are sometimes brought to light. Some roads make a practice of thoroughly overhauling motors and trucks when changing car bodies. This can be done to some advantage when double equipments are changed to single for summer use, as is the custom on some systems. However, on account of the hurry, at changing over times, it is a question whether under ordinary conditions it is best to put on the shop men the additional work of overhauling each motor at that time. Even where there are the best facilities for rapid handling of cars and trucks it is often the case that the first summer cars are put out in advance of the season and the last box cars do not disappear until hot weather has been on for some time. If there is any one place that a small investment in time and labor saving devices pays more than another, it is in the car barn, and

equipment is the extra investment that is lying idle six months in the year. To this must be added the expense of maintaining in respectable shape the extra set of car bodies.

PRICE HILL AT CINCINNATI.

One of the most severe grades yet operated over by electric cars in ordinary service is that recently opened for traffic on the Price Hill line of the Cincinnati Street Railway. Before the hill line was opened up this spring the electric road terminated at the foot of the bluff known as Price Hill and residents of the beautiful suburban village of that name located on top were obliged to pay another fare and take an incline road which landed them on top of the hill but left many of them still some distance



PRICE HILL—CINCINNATI, O.

this saving is most apparent at the time of the change of car bodies.

The car wiring takes more valuable time than the change of trucks. One of the most troublesome electrical details of the change is the disconnecting of the motor leads from the car wiring. The connecting board or motor board formerly used for connecting the car wiring and motor leads has been generally abandoned on all modern equipments, because of the multiplicity of connections and increased danger of wire breakages or short circuits. The elimination of the motor board and the substitution of a direct connection between motors and car wiring is a decided improvement, but like all other improvements, has its drawbacks. If a connecting sleeve with binding screws is used it is almost sure to work loose. If a joint is made and soldered it has to be cut every time the motor is disconnected and the wires are soon cut down too short for use. An improvement on either of these methods ought to be designed and put into general use.

After all the most expensive feature of the summer

from their homes. To build an electric surface road up Price Hill was not a small undertaking, and to successfully operate over it was not easy. Cuts and fills had to be made by the company and at one point a switchback was avoided by a very ingenious loop. The top of the hill is reached by a zig-zag course. The grade averages 8 per cent for about 4,800 feet. In one place it is a maximum of 11 per cent. The first change in the course up the hill takes place where two streets intersect at an angle which makes a direct turn impossible. At first thought the only apparent way out of the dilemma was to make a switchback at this point and change ends on the cars. This would have been a very undesirable procedure both on account of the time lost and because the rolling stock adopted by the Cincinnati Street Railway is arranged to run only one way except in cases of emergency. This relieves the necessity of having vestibules at both ends with the consequent weight, and inconvenience in handling the trolley ropes. To avoid the switchback the loop shown herewith was built. Ascending and descending cars go around this loop the same way and there is only

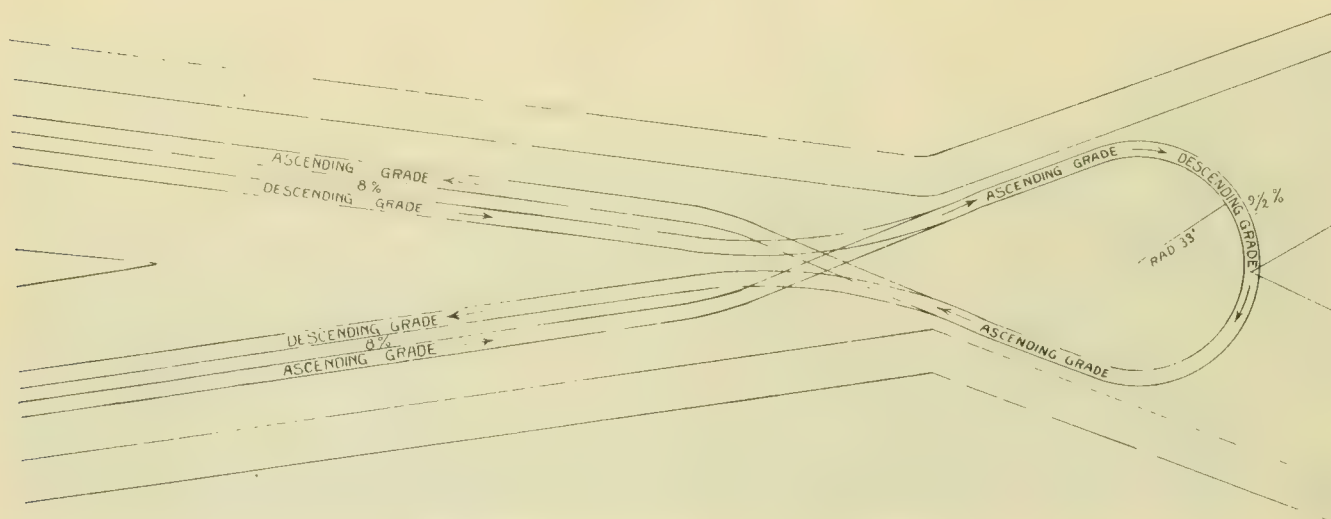
one switch to operate. At the next turning point on the hill the company built an embankment which is shown in the view of the hill. On this is a curve of 30 foot radius. From this point to the top there are no sharp turns.

To operate cars up this hill on regular trips all day it was soon found that a much more powerful motor was necessary than the G. E. 800 used on the other city lines. Accordingly G. E. 1,200 motors weighing 2,800 pounds, and wound for slow speed are run exclusively on this route. They were among the first G. E. 1,200 motors turned out. To climb the steep part of this hill from 100 to 120 amperes are taken for about 4 minutes. The G. E. 800 motors were so badly overloaded when tried on this work as to require much more current than this and be of very low efficiency.

The grade is of interest as showing what can be done in

TOLEDO ELECTRIC POWER UNITED.

Nearly all the electric power of Toledo will be concentrated at one point, as the electric lighting interests of the city have been bought by the syndicate that owns the street railway lines, which have been popularly known as the Toledo Consolidated Street Railway Company, although they were five distinct corporations, the Toledo Consolidated, Metropolitan Street Railway Company, Central Street Railway Company, Ironville Street Railway Company and Toledo Electric Railway Company. These roads have been in possession of and operated by the same owners for five or six years, but have been consolidated as the Toledo Traction Company, with \$4,000,000 capital, upon which bonds of \$3,000,000 will be issued. There are 65 miles of electric lines, of 4 feet 8½ inch gage, 56 and 90-pound rail. The equipment consists of



SUBSTITUTE FOR SWITCHBACK, PRICE HILL, CINCINNATI.

the way of grade climbing with surface cars. It is the length of the grade rather than its steepness that makes it difficult to operate over. The rise of 384 feet in 4,800 ft. of track is not the only grade, as it does not include a long, easy grade approaching the hill or short grades at the top. Cincinnati is noted for heavy grades, and the comparative work required of the motors on this and other lines can be judged by the fact that this is the only line requiring motors heavier than the ordinary. The emergency brake illustrated in our last issue, invented by B. L. Kilgour, the electrician, is used on this hill. It consists of four prongs which dig into the macadam pavement beside the rails. It does not stop a car with a jerk but is absolutely sure in its action and is intended to be used only in extreme emergencies. Something of this kind is absolutely necessary as a runaway car on this hill would be sure to result in a very serious accident. A line is now being built up College Hill by the same company which will average a 5 per cent grade for over a mile.

There are many interesting features of street railway work that have been developed in Cincinnati, and are well worth a visit by any who are interested in them.

130 motor cars, Westinghouse motors, and 20 trail cars. The engines are Hamilton-Corliss, developing 1750 horsepower.

The officers of the Toledo Traction Company are, Albion E. Lang, president, Charles L. Wight, secretary; Wm. E. Hale, Chicago, treasurer; Winfield S. Jewell, general manager; Charles A. Denman, superintendent; E. J. Bechtol, purchasing agent. It has not been fully decided how much power will be put in, but it is the intention to provide for the long future and to make a model plant. The Toledo & Maumee Valley Railway Company which runs from the city limits of Toledo through the villages of Maumee and Perrysburg, has a traffic arrangement that permits it to run its cars into the city over the tracks of the Toledo Traction Company.

Fourteen or less years ago Mr. Lang bought of its original owners a strip of strap rail and a few dilapidated cars, known as the Dorr Street Line. Improvements were made from time to time until the latest transaction which has placed him in charge of a most excellent system of electric railway together with all the electric light producers in the city. On December 31, 1892, Mr. Lang

drove the last horse car in Toledo into the barn and acted as first motor-man on the first electric car. He has been the pioneer, and can now look with pride on his part in the development of the practical side of the science of electricity.

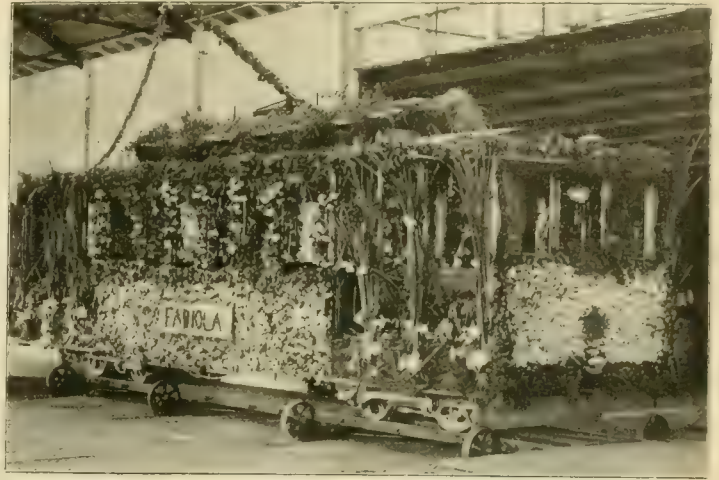
DECORATING CARS.

In no other section of the United States, except in the latitude of California, would it be possible to decorate cars in so lavish a manner, as shown in the illustrations. In the month of May was celebrated in Oakland, Cal., the Fabiola fete for the benefit of the Fabiola hospital, a worthy institution built by donations from wealthy citizens of Oakland, and the prices are so regulated to make it self-supporting, while there are in addition several free beds. The fete was given to raise money to enable the management to provide more free beds.

The various street railway companies made money contributions and each of them decorated a car to advertise the fete. A. K. Grim, superintendent of the Oakland Consolidated Railway; L. Wheeler, superintendent of the Alameda, Oakland & Piedmont Railway and Frank M. Leland, superintendent of the Oakland, San Leandro & Haywards Electric Railway company, cooperated, and a train consisting of one car from each road elaborately decorated with plants and flowers, and accompanied by a band of music, made a trip of 57 miles over the lines of the three street railway companies, through several large towns. The street railway companies had no object other than as a charitable act to advertise the fete.

The start was made at Thirteenth and Clay streets, Oakland, and the car went to Haywards, a distance of 16 miles. The return was made to Twenty-third Avenue,

the means of bringing considerable money to the fete. The decorations consisted of evergreens, roses, lilies, hawthorn and every kind of flower the companies could obtain. Mr. Leland says his company put on its car 35 large baskets of roses, 3 of marguerites, 4 of geraniums,



OAKLAND CONSOLIDATED STREET RAILWAY COMPANY'S CAR.

10 of lilies and about half a ton of evergreens. Flower gardens for miles around contributed their blossoms. It took a great deal of work to decorate the cars which was done mostly by employees of the companies and their wives.

Superintendent A. K. Grim, of the Oakland Consolidated Company, used pink and white roses on the body of his company's car, which were so arranged that no portion of the woodwork could be seen. The letters in "Fabiola" were of red carnations on a drab background made by the stalks, which were surrounded with a border of white carnations. Ferns, snow balls, marguerites, oats, bearded barley heads, calla lilies, yellow marigolds, cypress greens, and red geraniums were used. There were also a large number of incandescent lamps, which added to the effect in the evening.

While it may not be possible for many companies to decorate their cars so elaborately for special occasions, as the three Oakland companies have done, there is an idea to be obtained, that might be developed with profit in some localities. The decoration of the cars was for advertising purposes, and they were run over the tracks of three companies. Where it is possible to make connections in other cities, considerable revenue can be secured to each company by working the advertising feature. Of course the advertising will have to be on the outside of the cars, and it ought to bring a large sum, as the space is more valuable than that inside the cars, for it is seen by more people. Some companies sell their outside space, while others use it for themselves, and still others make no use of it at all, except for its original purpose.

In places where county fairs are held, some simple decorations of grains might be used, but it would not do to take cars out of service.



DECORATED BY OAKLAND, SAN LEANDRO & HAYWARDS ELECTRIC RAILWAY COMPANY.

East Oakland, 13 miles, thence to the power house in Alameda, 5 miles, returning to Oakland over the Alameda tracks, 8 miles. The cars returned to Twenty-third Avenue, 3 miles, and again over the tracks of the Haywards road to Oakland, 4 miles, then over the Oakland Consolidated tracks to the starting point, 4 miles.

The cars attracted a great deal of attention, and were

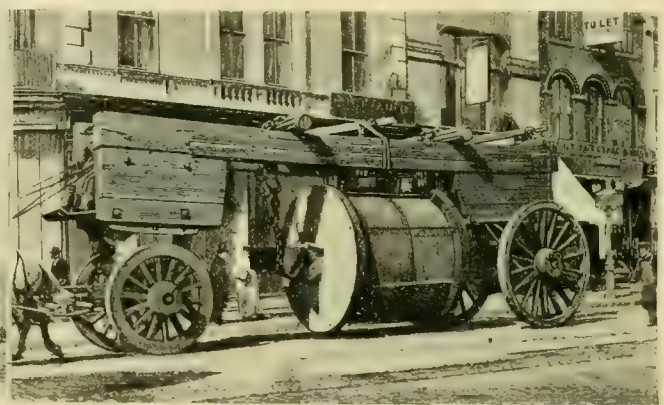
WORDING OF COAL CONTRACT.

Words are capable of having their meanings twisted, so that the impression conveyed to a listener and accepted by him, can often be changed if it suits his convenience. On this account great care should be used in making of contracts to leave no chance for dispute. While we firmly believe the Electric Railway Company, of Savannah, Ga., will win the appeal it has taken on a recent decision, the case shows the importance of care in the wording of contracts. The Tennessee Coal & Iron Company sued the Electric Railway Company for \$502.95 on a coal contract, the railway company refusing to pay the account as it claimed a credit of \$200 because it had to buy coal from other parties, as the coal company was hindered from delivering the coal on account of a strike.

T. G. Reed, secretary and treasurer of the Electric Railway Company, writes in behalf of the receivers, this

"Our contention in court was that the telegram and confirming order formed the basis of contract, and that the Tennessee people being right on the spot were better posted as to what the results of this strike would be, and yet in the face of all this information on their part they accepted the order, and we, relying on this, were compelled at the last minute to buy what coal we could. Their counsel argued that inasmuch as our telegram failed to mention any price for the coal, or stipulate the number of days coal was to be shipped, that this did not form a contract, and on this technical point the judge ruled us out. We appealed the case, and trust we will be able to get this ruling set aside."

Had the coal company failed to make any shipment after the receipt of the first telegram, or only made one shipment, there might be more grounds for the contention of the coal company's counsel. Having made two shipments after accepting the telegraphed order, the fact



TRANSPORTING LARGE CABLES.

explanation of the case: "For some months prior to the strike we had been getting coal from the Tennessee Coal & Iron Company, they having a standing order for three cars per week. Two or three weeks before the strike occurred, we noticed in a Savannah paper an article on the proposed strike, and as we did not wish to be caught without any coal on hand, we immediately wired the company to ship us three cars per day in addition to our regular standing order, specifying the kind of coal we wanted, namely, the run of the mine, and asking them to wire their acceptance. The same day we received a telegram from them accepting the order, and we mailed them that night a letter confirming the order. In order that there might be no mistake on their part, we added on the order the reason for our sending them this extraordinary order of three cars a day.

"They shipped three cars on receipt of telegram and two days afterward shipped three more. Noticing after an interval of some days, that they were not making any further shipments, we wired them to know what they were doing, and also wrote them. After some days we received a reply from them stating that they were powerless to do anything at the present as the strike had then commenced.

seems to be that it was fully cognizant that a new contract had been entered into, and had no strike occurred, could have taken advantage of the street railway company and continued to ship three car loads of coal a day, or 21 a week, including the amount originally contracted for, until the expiration of the original contract, if it had sufficient coal of the required grade in stock to do so. This case illustrates the importance of being explicit in the wording of contracts, as it has been demonstrated that three different constructions can be placed upon the proposition, according to the point of view from which it is observed.

TRANSPORTING LARGE CABLES.

In the May issue of the REVIEW was a description of a cable ride in New York city. The illustration shows the way the heavy load was carried through the streets of the city. One view, reproduced from the Scientific American, shows the long rope at the intersection of Broadway with Fifth Avenue and Madison Square. The rope which was made by the Hazard Manufacturing Company, Wilkesbarre, Pa., is six miles long without a splice, 1½ inches in diameter, of the best English steel wire and weighs 121,175 pounds.

CLAIM DEPARTMENT BLANKS.

Roads in large cities are never free from claims, which keep a large force of men busy making investigations and settlements. The more experience these roads have the more simple are their methods, especially in the pre-

WEST CHICAGO STREET RAILROAD COMPANY.

EMPLOYEES' ACCIDENT REPORT.

INSTRUCTIONS

TO GRIPMEN, CONDUCTORS, DRIVERS AND OTHER EMPLOYEES CONCERNING ACCIDENTS.

When an accident occurs to any person or property, or to the property of the Company, the employee who witnesses the same or is present at the time of the accident must fill out this report and submit it to the nearest available member of the Company. Such reports must be filled out at the time of the accident, and must be submitted to the nearest available member of the Company as soon thereafter as possible and in every instance before the employee goes home for the night.

Date of Accident.

Car No. Line

Time M Direction Going

Exact Place of Accident.

Train Composed of Grip Car No. Trail Car No. and Trail Car No.

REPORT

WITNESS NAMES

ADDRESS

Dated	Conductor.	Badge
189	Signed	
	Driver.	"
	Gripman.	"

CONDUCTORS' ACCIDENT REPORTS.

liminary work of securing reports. The standard steam road blanks printed in the May REVIEW were presented to show how much detail can be put in reports. In street

railway practice the facts and names of witnesses are all that are desired from the crews. The claim department will attend to working up the details.

Simplicity is the marked characteristic of the blanks reproduced in this connection by the kind permission of John B. Parsons, vice-president and general manager of the West Chicago Street Railroad Company, yet all the information needed will be found, if the blanks are properly filled. The employees' accident report blank is 14 inches long, 8½ inches wide, and only one side of the paper is used, the other being left blank. Employees must make these reports as soon as possible after an accident occurs, and before they go home. These reports are sent to the claim department, which begins its investigations and develops the details from the facts shown by the reports.

The next step is to send letters to all the witnesses. A printed form is used, which is shown in this connection. The size is that of common note paper, the first page being the letter, and the second and third pages for the questions and answers. With the information furnished in these two blanks, the claim department has ample data with which to begin work. Should the case be likely to develop litigation, affidavits are also secured.

The White-Crosby Company, New York and Chicago, has the contract for the entire construction, including furnishing of motors and cars for the Buffalo & Niagara Falls Electric Railway, which will have 30 miles of track of 73-pound girder rail in 60-foot lengths, and stone ballast; 16 miles of T rail construction, Atlantic Highlands, Red Bank & Long Branch road; also several contracts for the Baltimore Traction Company, City & Suburban and Baltimore City Traction Company, the latter amounting to \$100,000.

CLAIM DEPARTMENT

West Chicago Street Railroad Co.

89 W. WASHINGTON ST.

Chicago

189

Mr.

Dear

Your name having been returned to us by Conductor of Car No. as one of several witnesses to an accident which occurred on our line at

QUESTIONS.

ANSWERS.

1. Your full name and address?

2. Did you see the accident?

3. When and at what time did it occur?

4. Where were you when the accident took place?

5. Give full account of the accident as witnessed by you.

We ask you as a favor to kindly answer the questions on the back of this sheet, in order that this Company may have as complete an account of all the facts in relation thereto as can be obtained.

Yours very respectfully,

Dated 189

A. L. RODMAN,

Adjuster.

Address

INFORMATION BLANK CLAIM DEPARTMENT.

A 67-TON ELECTRIC LOCOMOTIVE.

It will be recalled that several years ago rumors were afloat that electric locomotives were to be used on one of the steam terminal roads of Chicago. The rumor was founded on the fact that Henry Villard, then president of the North American Company, was attempting to organize a large terminal system at Chicago and an



67-TON ELECTRIC LOCOMOTIVE.

order had been placed for an electric locomotive. The project fell through, but the locomotive was completed and is now at the Baldwin Locomotive Works in Philadelphia, where it was built. The plans were drawn by Frank J. Sprague, Dr. Louis Duncan and Cary T. Hutchinson. It was intended for special experimental work in handling heavy freight and switching and is built for slow speed and heavy traction. The general features are shown in the engraving. In some respects it is similar to what is known as the "consolidated" type of locomotive used for heavy freight work.

The drivers are 56 inches in diameter, the end ones only being flanged. The connecting rods are double jointed to allow flexibility of movement. The weight of the armature is directly on the wheels and not on the journals, while that of the field magnets is on the journals through the pedestal boxes. There is no spring support of any kind for any part of the motors. This is contrary to the prevalent opinion of what is necessary for a locomotive of this kind. Another difference distinguishing this locomotive from the large ones designed for the Baltimore & Ohio tunnel at Baltimore, is that the system is a unit, the motors all forming part of a single system having a rigid wheel base of 15 feet, and coupled together with quarter cranked connecting rods instead of having two or more bogie trucks with independent spring supported motors. The difficulty of starting with motors in series and uncoupled drivers on a slippery track probably led to this construction. With large drivers in a locomotive of this kind the designers do not consider that there is danger of excessive track deterioration on account of the dead weight of the motors. The City & South London underground does not use flexible suspension on its electric locomotives and the designers of this machine were guided by the results there obtained. The four

motors have magnetic circuits similar to the G. E. 800 motor. There are two coils forming two salient and two consequent poles. The fields are compound wound, the shunt field is light and only sufficient to keep the speed within reasonable limits at light loads and to return current to the line when running on down grades. The armatures were built by the Westinghouse company. They are slotted, and each slot carries four wires. The wires are threaded through tubes imbedded in the slots. The winding is two-path, the kind now generally adopted for multipolar work. The motors are wound for 800 volts at 225 revolutions. This is equivalent to 35 miles an hour with the motors in multiple. They will readily exert a constant draw bar pull of 10,000 pounds. The series-parallel controller gives any speed from zero to thirty-five miles an hour. This controller makes use of all four motors all the time, there being no transition points on which any motors are cut out. It is so heavy that it is operated by compressed air from the air brake system. The total weight of this locomotive is 134,000 pounds.

THE STANS ELECTRIC RAILWAY.

An interesting little electric road connects the Lake of Lucerne, Switzerland, with the foot of the Stanserhorn incline cable railway. It is 2.2 miles long and carries both passengers and freight. The gage is 1 meter (3 feet 3.15 inches) and grooved rails are insisted on by the authorities. The road runs along one side of the highway under bracket overhead construction. For rolling stock there are three box motor cars, two passenger trailers and two gondola freight cars. The trolley wheel is replaced by a sliding contact arrangement which seems to be giving satisfaction. The road is single track and this type of trolley contact allows the doing away with overhead switches at turn outs. At such points the wire is run midway between the main line and turnout so that both tracks use the same wire, the trolley of one car being taken off, while the other passes. The trolley has enough side motion to permit of this arrangement. Ten trains are run each way in a day and besides the large tourist traffic the surrounding country furnishes a good share.

A Boynton bicycle high speed road is talked of between Santa Monica and San Bernardino, by way of Los Angeles and Pasadena.

Tobacco chewing will have to stop on cars of the Union Depot Railroad at St. Louis. Rules were hung up in the cars requiring conductors to eject all who defile the floor with tobacco juice.

RULES AND DISCIPLINE OF STREET RAILWAYS.

BY H. S. COOPER, GENERAL MANAGER SCHENECTADY STREET RAILWAY COMPANY, SCHENECTADY, NEW YORK.

PART II.

Publication and Promulgation.

The practice of publishing a few of the rules—even important ones—on a card or leaflet, is not a good one, as it tends to make the employe attach undue prominence to these and by contrast to ignore the others. The rules and regulations should always be published as a whole and in book form, of size and shape to easily fit the breast-pocket of the coat. A good average size that will fit in nearly all cases, is 4 inches broad and 6 inches long. As there is no need for the cover to project far over the leaves, nor for the pages themselves to have much blank margin, such a sized book will allow of the printed matter, on each page being 3 inches wide and 4 inches long. This will give ample room for the rules of the largest road, without having so many pages as to make it cumbersome and at the same time is none too large for the use of roads having only a small number of rules.

The binding should be flexible or semi-flexible, strong, serviceable and plain, a black cloth—waterproofed—being the best. Inside of the front cover there should be a single pocket, opening towards the back of the book. In this pocket may be kept,—ready for reference, without fear of loss, and without wear or defacement—any printed or written orders, directions, schedules etc., or copies of them. The paper should be white, strong, of dull, smooth surface and of quality or thickness to prevent the printing from showing through from the opposite side. The type should be neat, plain and of proper size and kind for easy reading. Between each “section” of the rules, and following the laws and ordinances spoken of later on, there should be bound in, one or two blank leaves, for the purpose of pasting on or writing in, any new rules or amendments added after the books are published.

The book should be paged in the centre of the top of the page, for if paged at the corners the figures are liable to be torn or worn off.

The book should be thoroughly and copiously indexed, as to all its contents and in the case of the rules, both the rule number and the page number should be given, and the subjects treated on in each rule should be alphabetically arranged, as :—

Accidents, treatment of	Rule 7	Page	12
“ to whom reported	Rule 7 and 11	Page 13 and 15	
Advertising in cars not allowed	Rule 16	Page	19
Ambulances, right of way of	Rule 15	Page	18

The title-page should contain the “caption” of the rules, the date of their issue and the edition, the legal title of the Company issuing them, and the address or

addresses of its managing, business, or operating offices ; thus :—

Rules
for the government
of the
Power and Transportation Departments
of the
Blanktown Street Railway Company.

Second Edition, in effect June 30th, 1893, President's, Vice-President's, Secretary and Treasurer's Office, 626 Blank street, General Superintendent's Office Blank avenue and 110th street.

The books should be numbered consecutively when printed, the number stamped into the outside of the cover and on several of the pages inside. A record by this number should be kept of every person to whom any of the books are issued or given. As such a book “costs money,” and it is not desirable that the general public have them, but it is desirable that the employes take care of them, a specific and extra value of twice or three times the cost should be placed on each copy, and a deposit of this amount exacted from each employe to whom they are issued. In case the book is carelessly lost or destroyed the amount so deposited should be forfeited and a new deposit exacted before another book is issued. Such a method will enable the printing of a notice at the bottom of the title-page offering a reward of the amount of the deposit, for the return of the book to any one—or some special one—of the officers given on that page.

Following the title page should come the index, and after that, the notice of “promulgation and authority” signed by the proper executive officer. This notice should approve the rules, state the lines, departments, etc., to which they apply, and repeal all conflicting rules. It should also give the limit of authority and the power, of any chief operating officer or of any chiefs of departments who are appointed by the board of directors or their executive officer. The following form will give the idea:

The rules, etc., herein set forth, and all additions, amendments, supplemental orders, notices, etc., which may be hereafter added by the general superintendent, apply to and govern all the employes in the power and transportation departments of the Blanktown Street Railway Company and of any leased or operated lines which may hereafter come under its management.

The rules, etc., as above, are hereby approved—are to take effect at once, and as they may be issued in the future ; and will supersede all former rules, orders, and notices. The general superintendent has full authority, with power to hire and discharge, over all the employes in the above departments, and all rules, orders, etc., given out by his authority are hereby authorized and approved. He is also empowered to delegate this authority to the assistant general superintendent, whenever necessary ; to delegate the authority to hire and discharge to all division superintendents, and authority to suspend, to all foremen.

(Signed) JNO. W. BLANK,
Vice Pres. and Gen. Manager.

(Dated) June 10th, 1895.

As the rules are the laws of the company with regard to its employes, it is well to bring to the minds of all employes, especially new ones, the fact of the right of the company to punish them for a violation of the rules and to hold them responsible for any loss or damage occasioned by such violation. A "special notice" to this effect should be incorporated in the rule-book, and its place is immediately following the foregoing official approval.

The following form is offered as covering the points spoken of above, and it should be brought specially to the notice of new employes, as defining their responsibility in accepting employment under the rules.

SPECIAL NOTICE.

For any violation of the rules, orders, etc., of this company, whether such violation be ignorant, negligent, or wilful, the company reserves the right to suspend any employe without pay, with loss of all privileges and for any length of time; or where the occasion in the opinion of the company warrants it, to discharge any employe without notice and without recommendation.

For any loss or damage, directly or indirectly occasioned by such violation, the company will hold responsible the employe so violating, and also reserves the right to retain from the wages due to, the deposit received from, or the bond given by, such employe, an amount necessary to repay the company or others for the loss or damage.

In consideration of this notice, it will be held that any and every employe accepting or retaining employment with the company after the promulgation of these rules, accepts also the conditions of this notice.

In order to put beyond dispute the acceptance of these terms by the employe, it is the custom of some companies to print this, or a similar notice on separate sheets, with the addition of such a clause as "Having received a copy of the 2d edition of the rules of this company, and carefully read them, I agree to accept employment under them and the conditions of the special notice above." This they require all employes to sign when entering the employment of the company. Whether or not this latter is done, the notice, or one of similar import, should be placed in the rule-book and particular attention called to it when the books are issued.

In nearly all the states there are laws in regard to street railways, and in some states there are railway commissioners, whose recommendations have the force of law. Nearly all cities having street railways running within their boundaries, have ordinances relating to them, besides the provisions or conditions which are generally freely interpolated in the franchises granted by these cities. Many of these laws, recommendations, ordinances, provisions and conditions relate to matters in which the employes play an active and perhaps important part, and it is very necessary therefore, that they be informed of all laws, etc., which have any bearing on the duties they are to perform or the acts they are to avoid. There should therefore be inserted in the rule-book, the full text of all such laws, ordinances, etc., or of the portions that are applicable to the employes. These should each be headed with the authority making them, their date,

chapter or ordinance number, etc., and attention called to them, somewhat as follows:

"The attention of all employes is called to the following laws and ordinances, relative to their duties and responsibilities, all the provisions of which must be exactly complied with.

Section 3, Chapter IV., Laws of 1893.

Ordinance, No. 146 of 1892-93, of City of Blanktown,

Extracts from franchises of this company granted by City of Blanktown"

In each case giving the text exactly and in full. These extracts can be placed immediately following the "special notice," and several blank leaves should be left in binding the book, so that additional ordinances may be added as they (surely will) come.

Following these laws and ordinances should come any fixed general information, in regard to the company or its lines, which it is necessary or desirable that the employes should have at hand when on duty. Among these may be mentioned, the address or location of all the offices, sub-offices, car barns, power-houses, etc., the route of all lines belonging to or operated by the company, the names of all the streets and avenues crossed by these lines, the location of railway or steamboat depots, ferries, public buildings, hotels, etc., on these lines; in fact, as above stated, any fixed, general information for the use of all the employes, is in place here.

Any fixed special information applicable, or of use only to certain departments or classes, should not be placed with the above, but should be inserted at the commencement of the special rules for that department or class. For instance; the bell or whistle signals for use on the cars should precede the "General Rules for Conductors and Gripmen," or motormen or drivers, as this is "special" information for the use only of this one class or department. In the same way, any fixed special information, such as special forms to be used in reports, etc., in conjunction with some particular rule, should be inserted in or immediately following that rule. Information—whether special or general, which is not fixed, should not be placed in the rule book, but, if it is necessary that the employes have it at hand, it should be printed on separate sheets or cards, and issued to them. Among such may be mentioned, instructions for the operation of grips, motors, or other machinery, which may be superseded, or the methods of operating it changed, at any time. In fact, the effort should be, to make the rule-book as complete as possible, but at the same time to avoid putting in what is of no use at the time, or what may become of no use in the near future.

The foregoing constitutes all the extraneous matter that it is really necessary to place before the rules. It is however, considered desirable by some roads to make an address to the employes in the shape of a short and pithy "preface" to the rules, treating of the rules or of the general duties of all employes or of both. Opinions differ as to the necessity or even advisability of doing this. It is urged on the one side that it enables the employer to place the rules and duties before the

employees in their true light and to introduce certain matters, such as the practice of fidelity, honesty, sobriety and personal cleanliness which should be needless as rules but are still necessary to be brought to the attention of the employees. On the other hand it is claimed that the interpolation of such matter mars the official character of the rule book and tends to weaken its disciplinary effect.

As a matter of opinion the writer cannot see that such a preface, if carefully written, can do any harm and he therefore gives examples of two such addresses, both of which have been used. The first is in regard to the rules and is as follows:

INTRODUCTION TO THE RULES.

The rules of this company are for the protection and guidance of the employees as well as for their government. If the rules are strictly obeyed in spirit as well as in letter, the company stands ready to support the employee in any result that may follow such obedience.

The rules, orders, etc., are made only after a very careful consideration of all the facts in each case; it is therefore unwise for any employee to find fault with a rule where he is not positively sure that he knows all the conditions in the case, even then he must remember that there is no rule made for the benefit of the many that will not bear hard on the few and while an employee may find himself among the few in a few rules, he will find himself among the many in most of them. No employee must discuss or criticise the rules to or with any person not in the employ of the company. Discussion of them among employees is invited, and if after such discussion, any rule, order, etc., is thought to be unjust or incorrect, if the reasons for so thinking are presented to the proper officer, they and the presenters will have courteous consideration.

To those employees who have dealings with the public, the company would add the following advice. Avoid arguments with any outside persons who object to your obeying or enforcing certain rules in which they are concerned. Inform them quietly and civilly that your duty is simply to obey and enforce the rules of the company, that your neglect to do so will be the cause of loss of time or position to yourself, that you have no power or right to disobey them and that the simplest, easiest and best way is for them to allow you to do your duty or for them to obey the rules, under protest if necessary, and bring their complaint and protest to the proper place, the offices of the company.

The second form is in regard to the general duties and responsibilities of the employees as a whole:

A FEW WORDS TO OUR EMPLOYEES.

The business success and good reputation of the company, depend to a large extent upon you, as to you is entrusted the direct care and maintenance of its property and the direct personal relations with its patrons and the general public. In like manner, the success of the company affects you, as the trusted and efficient employees of a successful company are in more secure position, in better line for promotion and generally better able to "better" themselves at any time, than if either the company or themselves were not successful.

To be fully successful it is necessary that you are of good character and habits; faithful to the company and working entirely in its interests without any "side issues" of your own;

prompt and cheerful in the discharge of your duties and exact and willing in your obedience to the rules.

No employer desires to lose the services of a thoroughly faithful, competent and trustworthy employee, any more than he desires to retain the services of one who is unfaithful, untrustworthy and incompetent; therefore an employee who is strictly honest in all matters, who is of perfectly sober habits, neat and cleanly in his personal appearance and belongings, attentive and civil to the public and those in authority over him; doing his best in every way for the interests of the company; may feel assured that the company notes the fact and will act accordingly; while on the other hand, the employee who is the reverse of all this, cannot blame the company if he does not rise in its service, or if it dispenses with his services entirely.

All employees of this company will be regarded as in line of promotion, but advancement will depend entirely on length of service, faithful discharge of duty and the capacity for the increased responsibility that will come with the promotion.

The above "prefaces"—if used—are the last things necessary to insert in the rule-book, separate from the rules, which (the rules) can therefore immediately follow. The rules being divided into "sections," each such section should be headed with the name or classification of the rules in it, and the department, class, individuals or duties to which they apply, as

"General Rules for all Employees."

"General Rules for Track and Roadway Department."

"Special Rules for Power House Employees."

"Special Rules for Conductors in Relation to Car."

The rules should be numbered consecutively straight through the book, leaving, however, several numbers blank at the end of each "section," for the numbering of any new rules that might be added after the publication of the book. For the numbering of the rules, arabic figures should be used; the Roman numerals can then be used for paragraphs or sub-divisions, and if any further sub-dividing is done, it may be indicated by the letters of the alphabet.

Each rule should be headed, or its first line begun by its subject printed in a large and distinctly separate type, and it is as well to print in a different type, any word, phrase, paragraph, or even a whole rule, to which special attention is required. This should be done only when absolutely necessary, as too much of it accustoms the reader to it, and defeats the end desired. The following example illustrates the above points:

SPECIAL RULES FOR MOTORMEN IN REGARD TO CAR.

33. Brakes and Controller. I. When taking the car from the car-house, the motorman will—*before putting on his controller-handle be positively certain* that the other controller is at the safe or "off" point, and that all necessary "switches" or "cut-outs," have been properly placed.

II. He will, under no circumstances, allow the controller handle to remain on its shaft *except he has his hand on it*. It must NEVER leave his possession, except

A. To another motorman.

B. To the inspector or foreman.

C. To a conductor, in case he himself is sick, disabled, or compelled to leave his car.

D. To a man "under instructions," and then *only* when he is standing beside him.

E. To its proper hook in the car, when the latter is "housed" in the car barn.

The foregoing, it is believed, covers all the necessary points in regard to the rule-book, and the matter of orders, notices, etc., will now be taken up. These—(and in fact all communications to or for employes) should be especially clear and concise. Many of them are "posted" on "bulletin" or "notice" boards, and their meaning will frequently have to be gathered from a single and oft-times hasty, perusal. In view of this fact it is always better to "head" or "caption" them in such a way as to draw immediate attention to the important points, and impress them on the memory of the reader. The points to be observed in such a heading are:

- 1st. Kind of communication.
- 2d. Consecutive number of same, (if any.)
- 3d. Subject.
- 4th. To whom it is directed or applies.
- 5th. The date it goes into effect.
- 6th. The period for which it is to be in effect.

The following are some suggestive forms for such headings, and will make clear the idea intended to be conveyed:

General Bulletin No. 128.

Relating to.—New Schedule.

For information of.—All Transportation Dept. Employes.

For guidance of.—All Starters, Conductors and Drivers.

In effect.—12 Midnight, Thursday, Aug. 18th, 1895.

Superseding.—All previous Schedules.

Special Order, No. 16.

In relation to.—S. S. & V. R. R. Crossing.

For instruction of.—Motormen of East Avenue Line.

Issued.—February 19th, 1895.

In effect.—First trip, Sunday, February 26th, 1895.

Superseding.—Special Order, No. 9.

Special Notice.

Amending.—Paragraph IX., Rule 13.

In regard to.—Despatching cars.

For instruction of.—All Car-starters.

In effect.—At once, June 30th, 1894.

Special Instructions.

For operating.—New X. Y. Z. Controller.

For information and guidance of.—All Motormen.

Headings such as the above, should be of larger or different type than that which is used in the body of the document, so that its items will quickly catch the eye.

If the order, notice, etc., is to supersede, or if it will conflict with any previous order, notice, etc., the latter, or the conflicting or superseded part of it, should be expressly repealed in the new one. All such documents should be signed by the officer or head of department issuing them.

"Bulletin" or "Notice" boards should be erected in every location where it is necessary that documents should be posted. Wherever it is possible, the location should be such that they are protected from the weather

and can be overseen. All papers should be securely fastened and in such a manner that all reading matter on them is plainly visible. It will aid greatly in the space occupied, in the appearance and keeping of the board, and in the locating of the various documents, if they are all of one standard size or multiples of that size.

It is advisable to have a portion of the board, say, a narrow section at top or on one side, prepared as a blackboard, on which may be written with a crayon, notices calling attention to any new rules, etc., as they are posted on the board; to old orders, notices, etc., to which special attention is desired, and to the removal or cancellation of any document or part of one.

All finite notices, orders, etc., should be removed as soon as the circumstances or conditions which called them forth are fulfilled, or if they have been made or issued to apply only for a specific time, they should be withdrawn and removed just as soon as that time is up.

Any document, the contents of which are superseded or repealed as a whole should be removed at once, or if only a part is affected, that should be cancelled or "blacked-out" at once. There should be no "deadwood" on the boards; everything "live" should be there, and everything there should be "live." No document once posted and whose contents are in force should be removed, except it is desired to make a "rule" of it, in which case it will be transferred to the rule book by a special notice to that effect.

Communications direct to individual employes should always be formal in character, full, explicit and to the point. If they are sent to any sub-officer or head of department in their official capacity, the title should in all cases be added to the name; and in all formal communications to employes the use of "Mr.," "Mrs." or "Miss" should be the rule.

In the sending of any important order, notice, etc. to any department or individual, it should be the rule to send with it a formal and specific receipt for the same, which is to be signed at once by the person receiving it, and the receipt returned to the sender. Such a form of receipt can be made very simple and comprehensive, taking only a few seconds to read and sign, and as such a form will often fix a responsibility or prevent a dispute, its regular use is urgently advised.

In the present era of type-writing, and the many good methods of manifolding the same, there is no excuse for any formal communication or document being written with a pen. No pen-writing is so compact, legible and clear as is the type-writing of a good machine, therefore, where the size of the road is not sufficient to warrant its orders being printed, they should in all cases be type-written and manifolded in an indelible ink, and the original filed in an indexed blank-book, specially kept for that purpose.

The Connelly gas motor car which was recently built at New Castle, Pa., will be run on the Brooklyn, Bath & West End road at Brooklyn, N. Y.

BROOKLYN CHANGES.

Benjamin Norton has resigned as president of the Atlantic Avenue Railroad Company, Brooklyn, and will be succeeded by H. M. Littell, of the New Orleans Traction Company. Mr. Norton went with the company two years and a half ago from the Long Island Railroad



BENJAMIN NORTON.

Company, and retires from the street railroad business to go again into the steam road field. His contract was only for a year, but the company could not afford to let him go. "I had had this matter in mind some for time before the strike began," said Mr. Norton, "but when that struggle was on, I could not leave the company and so put it off until it was again running smoothly.

When I went with the company it was not half trolleyed. My arrangement was only for a year, and I have now been with the company for two years and a half." Mr. Norton was born in Erie, Pa., in 1855. He was graduated from Williams College and studied law, but turned his attention to railroading in 1879, with the Manhattan Beach Railroad Company, and in 1881 was connected with the Long Island Railroad Company, retiring as vice president to enter the street railroad work.

H. M. Littell seems to be a specialist in helping roads out of difficulty, even if he is unconscious of possessing this faculty. Wherever he has gone he has made for himself and the companies a record to which both parties can point with pride. He went from the office of general manager of the St. Paul roads to the Mt. Auburn Inclined Plane & Street Railway Company, Cincinnati, whose stock was going begging at five cents on the dollar. Under his administration the road was equipped for electric traction, and soon began paying dividends.



H. M. LITTELL.

From Cincinnati Mr. Littell was called to be manager of the consolidated lines of New Orleans, being general manager of the New Orleans Traction Company, and president of the leased lines. Under his supervision and

direction, the equipment of these lines was changed to electric traction, and it is one of the finest systems in the country. Now Mr. Littell goes to Brooklyn, where he will begin July 1, his duties as president and general manager of the Atlantic Avenue Railroad Company. His many friends in the street railway world will congratulate him on his promotion.

WHERE DISTANCE DOES NOT LEND ENCHANTMENT.

The distorted appearance of many American institutions as seen through the English press, seems inexplicable even after allowing for the long range. The follow-



ing illustration appeared in a recent number of the London Graphic, but is scarcely farther from the truth than the explanation which accompanies it, and which is as follows:

A RUNAWAY CABLE CAR IN UNION SQUARE, NEW YORK.

"Since the introduction of cable tramways in New York, accidents have been somewhat frequent. Every now and then a car breaks loose and dashes into everything in front of it with results that are often serious. Foot-passengers are seen to glance warily up and down the street before crossing the Broadway, in order to be sure that one of these ungovernable machines is not coming."

As a matter of fact, the cars do not run very fast around this curve, as the speed of the rope is $8\frac{1}{2}$ miles an hour, which is not rapid enough to cause any such commotion as is represented.

ACETYLENE FOR CAR LIGHTING.

The discovery of a method of cheaply producing acetylene has aroused great interest in the scientific world. From this gas there may be derived many organic compounds of great value; but street railwaymen are more directly concerned with its remarkable power as an illuminant.

Acetylene is a clear colorless gas with an intensely penetrating odor. It burns with a black smoky flame. Mixed with twice its volume of air the gas becomes explosive. The explosive force increases as more air is added, up to twelve volumes, after which it decreases, and when diluted with twenty times its bulk of air it ceases to be explosive. The illuminating value of a burner consuming 5 cubic feet an hour is equal to 240 candles. Under a pressure of twenty-two atmospheres, the gas becomes liquid, and in this condition is readily portable in steel cylinders.

While trying to reduce a mixture of lime and carbon in an electrolytic furnace, Thomas L. Willson, Sparta, N. C., obtained a dark gray, brittle substance known to chemists as calcium carbide, and consisting of one atom of calcium and two of carbon. When dropped into water the carbon leaves the calcium and combines with the hydrogen of the water, forming acetylene, consisting of two atoms of carbon and two of hydrogen.

Dr. Francis Wyatt, a well known chemist, says that 2,000 pounds of calcium carbide can be produced from a mixture of 1,200 pounds of fine coal dust (\$2.50) and 2,000 pounds of burnt lime (\$4) at an expenditure of 180 electrical horse-power per hour, for twelve hours (\$6) and \$2.50 worth of labor; total, \$15; and by merely mixing with water, this quantity, one ton, yields 10,500 cubic feet of acetylene. When mixed with the required amount of air, the result is a gas equal in illuminating value to 100,000 cubic feet of city gas of 22 to 25 candle power per 5-foot burner; that is, pure acetylene at \$1.50 per 1,000 feet is diluted with air to ten times its bulk, making the cost of the diluted gas 15 cents per 1,000 feet. This estimate is based on the most favorable conditions, in practice the cost may be double. Even so it compares well with coal or oil gas.

For car lighting, it is proposed to manufacture the carbide at a few large works, and distribute to the towns where required. Each car will have a strong steel cylinder. A quantity of carbide as received from the factory will be placed in the cylinder, water added and the filling door closed air-tight. Spontaneously and gradually the gas will generate, pass through pipes to the burners, being mixed with air on the way, and give a brilliant light.

SAVED BY TWELVE INCHES.

Charles Ransom, a bicycle rider, was saved from being run over by a cable train, May 23, at 125th street and Manhattan avenue, New York. Some one punctured his pneumatic tire as he was about to cross the cable tracks in front of a car, letting the wind out of it and

causing him to fall on the tracks. Fortunately for Ransom the car was equipped with the Genett air brake, which was quickly applied by the gripman, who brought the car to a stop within a foot of him, so that the young man undoubtedly owes his life to the Genett air brake, which demonstrated its value in emergencies of this kind.

POPULARIZING A SUMMER RESORT.

S. J. Macfarren, vice president and manager of the Homestead & Highlands Street Railway Company, Homestead, Pa., has advertised the company's summer resort at Schenley Park in a successful and novel manner. All the merchants in Homestead were interested and advertised themselves at the same time. Mr. Macfarren writes:

"Reading a late account in your columns about a half-rate for school children as an educator for traffic over a new line in Freeport, Ill., suggested to me the idea of offering a trolley party to the school teachers of Homestead over our road, which is the first to connect this place with Pittsburg by means of the Brown bridge over the Monongahela here. The citizens having given a banquet and parade and otherwise testified their approval of our enterprise, the school teachers graciously accepted my invitation and accompanied me to Schenley Park, through which our road runs, and spent an afternoon in the conservatory among the flowers, with every evidence of pleasure at the new facilities for Homestead's amusement lovers.

"Meanwhile, the merchants not to be outdone, had numerous signed an offer circulated by Chief of Police Gessner to pay the cost of a special car for each room in the public schools (some thirty in all) for an afternoon trip (except Saturday and Sunday) to the park, which is four miles distant, leaving at 1 o'clock and returning at 5 o'clock. These excursions are made at a special price of course and the children are in charge of their teachers and accompanied by the donor of the trip, who sometimes adds to the pleasure by chartering park wagons for the circuit of the park, furnishing refreshments and other extras. As we are still under construction and short of cars, we are only able to handle four rooms per day and it will take another week to complete the pleasant task."

This incident is interesting for two reasons. One is, that it can be successfully used in other places; the other is, that it shows how widely the REVIEW is read, because it always contains many good things for increasing revenue and cutting down expenses, that have been tried by managers, and can be adopted by their fellows with profit. The REVIEW is the only publication in this field that makes a specialty of these two important points—revenue increasing and saving of expense. By its wide and strong connections it has exceptional facilities for obtaining the results of successful experiments in these two directions, as well as in all other branches of the street railway world.

CABLE TRAM SUPPORTS.

One of the worst places in the west for snow slides is, perhaps, the west slope of the Cascade Range in Washington. In the Monte Cristo Mining District the gulches are narrow and the mountains rise very steep to a height of from 2,000 to 3,000 feet. The tops are sharp rocky cliffs. The camp of Monte Cristo is at an elevation of about 2,900 feet above the sea. The climate here is mild, the snow heavy and wet, and usually followed by rain. The snow clings to the peaks until started by rain or its own weight, when it soon accumulates into an immense slide, which thunders down the mountain at a tremendous speed, making a roar which can be heard for miles, and which sometimes lasts for 10 minutes. These slides begin in November and continue all through the winter, and often as late as the middle of May.

In the middle of January 1894, one slide occurred within one-half of a mile of the camp which was estimated to cover, when piled up at the bottom, 40 acres of

the high ground, but, as it is, a tower must be erected which will offer little or no resistance, and exposing a like surface on all sides. It was also thought that the entire mass of snow would slide over the ground, but was found that the most common slides are composed of the new loose snow which rolls over the old using it as a base. By March 1st the snow at the base of the mountain gains a depth of from 30 to 40 feet, the result of heavy snow falls and accumulated slides. After this other slides will pass over the top, breaking off at the snow line any ordinary structure which exposes surface.

It was thought at first that wedge-shaped stone piers constructed on the upper side of the towers would divide the slide and afford protection. This works very well in the early part of the season but they would need to be 30 or 40 feet high to be of any use during the spring slides. Several attempts were made to maintain structures on this hill, but it was unsuccessful until the winter of 1894 and 1895 when the new tower was tested.

J. W. Mercer had occasion to observe the snow in this



NO. 1.

NO. 2.

NO. 3.

NO. 4.

ground, and all the way from 50 to 75 feet deep. It will be seen that nothing of ordinary structure can be made in the line of such force.

Across the northern base of Wilmans mountain (one of the highest in the district) are constructed two Bleichert cable tramways, one is 3,400 feet long and the other 6,600 feet. They were erected in the fall of 1893, and are used for conveying ores from the mines to the concentrator. These two tramways run nearly parallel, and for a distance of about 2,500 feet are exposed to the snow slides. It is for this place that a special tower has been designed and built, one, which it is thought, will withstand the slides. The lower slope of the mountain is partially timbered, but cut by parallel gorges which run from the base to the peak. The first slides of the season invariably follow these, and working on this theory, the towers first constructed were placed on the high ground between the gorges. However, by the 1st of February the cuts in the mountains are entirely filled by the slide of snow, and the surface becomes a smooth plain, after this the most terrible slides occur, and often take a course entirely different from that expected.

If the slides followed a marked course it would be an easy matter to maintain a line by building the supports on

district and drew designs for the new towers from the lessons of nature. On visiting the line one morning, after a night made hideous by constant rumbling of slides, he found that a 40 foot tower, style of figure No. 1, had been struck, snapped off at the snow-line and carried a distance of some 1,500 feet down the mountain, while immediately below the station, in line of the slide, stood a hemlock tree about 20 inches in diameter uninjured; the great pressure of the snow against the tree had formed a knife of ice on its trunk for about 20 feet high, the slide having struck and passed to either side.

Figure No. 1 is a photograph of a tower built after the style generally used by the Trenton Iron Company, builders of the Bleichert Tramways. This tower is 50 feet high and 20 feet square at the base, the legs are 10 by 10 inch hewn sticks, and the sills are sunk in the ground and lagged and loaded with rock.

The new towers are simply a large tree-peeled and sunk from 15 to 20 feet in the ground. The arms and caps are notched and bolted in. The towers are guyed at the top with half inch steel cables. Figure No. 2 is a photograph of one of the largest of these, which is 115 feet long and 48 inches in diameter at the butt, and sunk 18 feet in the ground. The top cables are 90 feet above

the ground when the tower is standing. These towers have been erected in place of the frame towers carried away by the snow.

The season is now past and they have stood firm through the entire winter. Many slides have struck them but have gone around the masts having made no apparent impression.

The success of this new style of tower is very gratifying since they are much cheaper where timber is plentiful.

Figure No. 3 is a photograph showing trees in comparison, and figure 4 is a photograph of one of the smallest of the new towers. The photographs and description of these towers were kindly furnished us by J. W. Mercer.

FIRST TROLLEY CAR ENTERS THE HEART OF CHICAGO.

At 11 o'clock on the morning of May 25 the first trolley car propelled by electricity entered the down-town district of Chicago. The entering wedge which will probably gain the trolley wire admittance to the entire down-town district, was made on Clark street from the river to Lake street. The trolley wires had been strung for several days previous to the event. The line is the down-town terminus of the North Chicago Street Railroad's Larrabee and Market street line. It crosses the Clark street bridge and extends two blocks south of it to Lake street. On the afternoon of the same day that the trial was made the line was put in operation.

HOUSE MADE OF OLD CARS.

Charles Stahl, a gripman, of San Francisco, has built a house of three car bodies at a cost of about \$90, which he thinks is better than another kind of building, which for the same amount of room would have cost between \$200 and \$300. The cars cost him \$15 each, and \$9 each to move them to their final resting place. The three



cars are side by side. The north one is the kitchen and dining room, the middle car the two sleeping apartments and the other a sitting room and store room. Bunks are built across the middle car and in the others, tables and seats are constructed along the sides. Little furniture is

needed. No doors have been cut in the sides of the cars but the platforms on one side have been covered, so that in stormy weather the occupants may pass from one apartment to another without being exposed. The cars



are built on a lot overlooking the ocean, and its proud owner thinks his property is worth \$3,000, although it cost him less than \$600.

Quite a number of old car bodies are being sold to Californians, who are using them for house boats. The body is placed on a scow, and is all that can be desired in a house boat, requiring of course a few alterations.

PROFIT SHARING WITH EMPLOYEES.

The Anacostia & Potomac River Railroad Company, is trying for three months a profit sharing plan, that was decided upon to settle a strike lasting two days in April. The road has 15.38 miles of 60-pound grooved girder rail, 43 cars and 180 horses. Wages are about 13 cents an hour, 20 per cent less than in 1892. The road does not employ conductors as there is little off and on riding. The men asked for an increase of 20 per cent in wages, which would put them where they were in 1892. The company refused to grant the request, as earnings were not sufficient. A compromise was effected, which was tried during April and May and will be continued during June. The receipts of each month are compared with those of the corresponding month of 1894, and if there is any excess it is divided among the employees pro rata in proportion to the amount received by each employee during the month. The employees were grievously disappointed at the end of the first month, as they evidently expected to receive enough money to last the rest of their lives, but there was only \$36 to divide. Until a day or two from the end of the month, it looked as if there would be considerable money to divide, rainy weather, however, kept people indoors, while expenses continued.

H. A. Griswold, president of the company, says: "We believe the result of this plan is to increase the diligence of employees, and improves the service in that way, at the same time stimulating honesty on their part as well as that of a certain class of riders whose sympathies get the best of their honesty and prefer the driver to get the money rather than the company. To what extent the plan may be profitably employed depends on different conditions."

Charles J. Mayer, Philadelphia, placed an order with the Partridge Carbon Co., Sandusky, O., for a carload of carbon brushes—about 120,000.

STREET RAILWAY LAW.

EDITED BY FRANK HUMBOLDT CLARK, ATTORNEY AT LAW, CHICAGO.

Alighting from Car at other than Regular Place.

It is not negligence as a matter of law to attempt to alight from a car on the side opposite to that prepared for the reception of passengers if those in charge of the car have invited an alighting on such opposite side.

That a car has not reached the usual stopping place when a stop is made and a passenger attempts to alight, will not render him guilty of negligence if there was no warning not to alight, and from the surroundings a passenger might well have understood that the stop was made for that purpose.

The court said, in part :

"The defendant contends that upon the whole record it appears that the landing place provided on the northerly side of the track was suitable and proper, and known to the plaintiff to be so, and that she had no right to alight on the side of the car next the loop, and that, if she chose to do so, it was at her own risk; and it is further contended that the plaintiff's testimony, taken as a whole, failed to make it clear how the injury occurred, and also that the grounds inside the loop were a reasonably safe landing place. A number of other questions are raised, relating to rulings on the trial as to admissibility of testimony, refusal of requests to charge, preferred by counsel for the defendant, and the charge of the court on its own motion, which will be considered in order. The plaintiff's theory is that in attempting to leave the car she stood with both feet on the running board; that a gentleman who was aboard the car assisted her from the running board to the ground; that she clasped his hands in making her descent to the ground, and that, upon stepping down from the running board, she stepped upon the steep bank of earth, which the testimony shows to be somewhere from four to five inches high; that her foot slipped and gave way, and that she fell, and received the injuries in question. The defendant's theory as to the manner of her injury is that the true cause of her injury was not the uneven condition of the ground, but that it was occasioned by some person stepping upon the plaintiff's dress as she was alighting, thereby throwing her to the ground; and the defendant offered the testimony of numerous witnesses tending to sustain this theory.

"It is strenuously insisted that, the company having provided a safe landing place on the northerly side of the loop, its full duty to the passengers was performed, and that it cannot be held liable for an injury occurring by reason of a passenger attempting to alight inside the loop. Upon this question the trial judge charged the jury as follows: 'A street railway company has the right to select and adhere to the making of their own arrangements for platforms and landing places at such resorts as Reed's lake, provided, only, that they make the landing place on one side safe and commodious, and so conspicuous that all passengers can see it by day or by night, unless it has been so used, and is so used, and the circumstances are such, in connection with the landing, as amounts to an invitation to alight on the other side;' and further: 'It is cer-

tain, under the testimony in this case, that the construction of that walk and landing, running from 30 feet wide down to 10 feet each way, and an extent of from 150 to 200 feet along this north side next to the resort, that it offers a plain and palpable invitation for the passengers upon its trains to get off upon that side; and I have no doubt that under the arrangements as testified to, and uncontradicted, in order for the company to be held as inviting an alighting upon the inside of the loop, that there must be, and should be, some positive act on the part of the company, as if a conductor should invite a passenger to get off upon that side, or as if any arrangements had been made for the landing of passengers upon that side; and I believe the law to be, under the peculiar testimony in this case, that there should be something that you should fix in your minds, other than the fact that passengers upon a loaded train, riding upon the running board, upon the outside, saw fit to jump off within the loop, and run around across the track to the place of amusement.' This charge was sufficiently favorable to the defendant, and fairly stated the law of the case, if there was any testimony tending to show that passengers had been, by the course of conduct of the defendant, invited to alight upon the inside of the loop. See *McDonald v. Chicago & N. W. R. Co.*; 26 Iowa, 124 96 Am. Dec. 114; 2 Redf. Railways, 532. We also think that there was testimony which justified this instruction. According to the plaintiff's testimony, she had previously been helped off the car by conductors inside the loop, and there is abundant testimony in the record that the common practice was to alight on either side indiscriminately. The car was so constructed that passengers could alight from either side, and there was no warning or notice to passengers to step off only on the northerly side. The cars were crowded with passengers, and the evidence shows that, as some would alight, others would press forward and take their seats. Under these circumstances, we are not prepared to say that, as a matter of law, it was negligent to attempt to alight on the inside the loop. But it is said that the car had not reached its usual stopping place, nor the place where plaintiff had been previously assisted to alight. But the car had come to a full stop on the occasion in question. There was no warning not to alight, and a glance at the surroundings is sufficient to indicate that a passenger might well have understood that the stop had been made for that purpose. The evidence shows that not the plaintiff alone, but substantially all, if not all, the passengers, interpreted the stop as an invitation to alight. The cinder walk was opposite the stopping place on the north, and the car was directly opposite the walk which leads to the pavilion. We also think the question of whether the uneven condition of the ground was such as to amount to negligence on the part of the company was, under the circumstances of this case, fairly a question for the jury. The plaintiff's theory was that the bank of earth from

which her foot slipped was directly at the point where one, in alighting from the car, would be likely to step upon its edge, and slip backward. We are not prepared to say, as a matter of law, that this was a suitable landing place.

(Supreme Court of Michigan. *Poole vs. Consolidated Street R. Co.* 25 Lawyers' Reports Annotated 744.)

Crossing Frequented by School Children—Care Required in Running Electric Car—Duty of Child to Look and Listen.

On a motion for a nonsuit every intendment and every fair and legitimate inference which can arise from the evidence must be made in favor of the plaintiff, and the court must assume those facts as true which the jury could properly find under the evidence.

The law demands greater vigilance and care in running an electric street-car over a public street crossing which is much frequented by children going to and returning from school at a time when they may reasonably be expected to be using the crossing than is demanded at other places.

It is for the jury to judge whether the failure of a school child to look or listen before attempting to cross a street-car track shows a want of that degree of care which could reasonably have been expected of such a child.

The presumption that a person seen on a street-car track will leave it before a street-car reaches him cannot be indulged in, when a child of tender years is seen on the track.

(Supreme Court of Oregon, *Wallace vs. City & Suburban Railway Company*, 25 Lawyer's Reports Annotated 663).

Driving on Wrong Track—Injury by Car.

A., driving on the right-hand track of a street, turns off to the left hand to allow a car to pass him. He then starts to get back on the right-hand track to allow a car coming in the opposite direction to pass, but is prevented from doing so by a wagon coming towards him on the left track, moving over to the right track to allow the car to pass, and the car coming at a rapid speed runs into him. Held that there is no such act of third party intervening between the negligence of the railway and the accident as to remove the liability of the railway.

The fact that a man is driving along the left-hand track of a street railway, which occupies a public street, is not negligence on his part per se.

(Supreme Court of Pennsylvania *Thatcher vs. Central Traction Company*. 25 Pittsburgh Legal Journal 321.)

Injury to Minor—Trespasser on Car—Duty to Trespasser.

"No negligence on the part of the defendant was shown unless its failure to comply with the following ordinance be such: 'Sec. 1515. It shall be unlawful for any of the horse railway companies of the city of Chicago to suffer any car to be run on any of the streets or any portion or part thereof in said city at any time unless the same shall be in charge of and under control of some competent conductor, who shall be a person other than

the driver of said car. For each and every violation of the provisions of this section, the said companies, or either of them, shall be subject to a fine of not less than \$10 nor exceeding \$100.'

"It is questionable if this ordinance is applicable to cars which are not being used for the transportation of passengers. The term 'conductor' as applied to the business of railways, signifies the chief official on the train, who controls its movements and usually collects fares, Century dictionary. Be this as it may, it does not appear that the injury to the plaintiff was caused by the failure of the defendant to comply with the ordinance.

"It is argued that if there had been a conductor with each car the plaintiff would not have jumped upon the car. We do not see how this follows. The ordinance does not make it the duty of the conductor to keep small boys from getting thereon, nor at what place in the car he shall remain. The conductor might under the ordinance have, properly, been upon the rear platform or seated near the rear door. It is not possible for one conductor to be at all times so stationed so that he can prevent children jumping on in mere sport. Unquestionably passenger cars, as well as teams of all kinds, do afford an enjoyment to children to jump on, "hitch" on, make use of the vehicle in play, but we are aware of no rule making it the duty of those in charge of cars or carriages to be all the while so stationed that boys cannot jump or "hitch" thereon in mere sport.

"As to this see *Chicago W. I. Ry. Co. v. Roath*, 35 Ill. App. 349. It is a favorite amusement of boys to jump onto a car, ride a short distance and jump off. Also to jump on and "ring up" fares on the conductor. Car companies are bound at all times not only to exercise ordinary care, but oftentimes great care that no one in the street is run over or injured, but this care is due not so much to trespassers, as to those making use of the street or car in an orderly manner and proper manner. The plaintiff was a trespasser, injured, so far as appears, without fault of the defendant."

(Appellate Court of Illinois. *Chicago West Division Railway Company vs. Hair* 27 Chicago Legal News 244.)

[See also *Bottoms vs. Seaboard & Roanoke R. Co.*, 25 Lawyer's Reports Annotated 784 and note.—ED.]

Driving on Track—Collision With Car Approaching From Behind.

It is not negligence to drive on a street railway track.

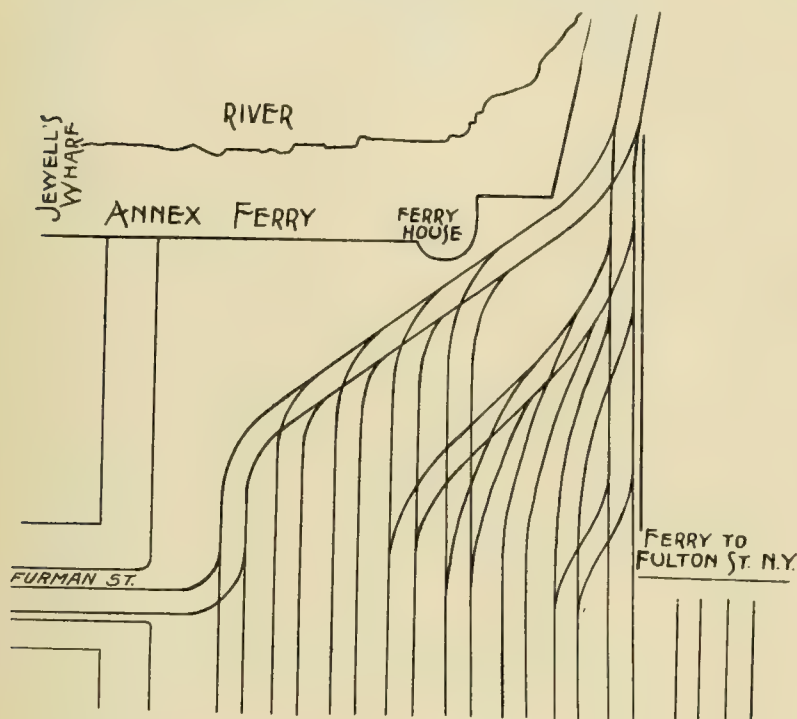
A driver of a van is not guilty of negligence contributing to a collision with a car approaching from behind without warning, in driving upon that one of two tracks upon which the cars will approach from behind, where he looks back shortly before the collision to see if a car is near.

(Brooklyn City Court, *Arnesen vs. Brooklyn City Railway Co.* 29 New York Supplement 748.)

On July 2d at noon William Shaw, receiver, will sell the works of the Gilbert Car Manufacturing Company, at Green Island, N. Y.

BROOKLYN TROLLEY MAZE.

Probably nowhere is there an electric railway terminal like that at the Fulton Ferry, Brooklyn. The illustration looks as if a terminal yard of a big steam road were being shown. The Brooklyn trolley maze differs from



the steam road terminal in that the cars are moving all the time, and are not stored there. It is an interesting sight during the rush hours to see the masterly way in which the cars are handled, and the manner in which blockades are avoided, for foot and team traffic is heavy.

LOS ANGELES ELECTRIC TO BE SOLD.

Bondholders of the Los Angeles Consolidated Electric Railway Company have demanded that the trustees sell the entire system to satisfy their claims. The demand is made by holders of \$1,038,000 of the entire issue of \$3,000,000, and are San Francisco Savings Union, Bank of California, William Alvord and Pacific Rolling Mill Company. When the road was transferred to the bondholders by the stockholders under a three year's lease, the latter were to pay off the floating indebtedness, and reduce interest on bonds from 6 to 5 per cent, which should be suspended until floating indebtedness was paid. The latest move is to strengthen the holdings of the bondholders.

The Jefferson Avenue Railroad Company, St. Louis, has placed orders for cars with the La Clede Car Company, St. Louis; General Electric Company, G. E. 800 motors; Arthur S. Partridge, St. Louis, wire and overhead material; Wm. Wharton, Jr. & Co., Philadelphia, rail and special work.

THAT \$300,000 CAR CASE.

On June 18 will begin the hearing of arguments on the motion of the Chicago General Railroad Company for an injunction restraining the Chicago City Railway Company from preventing the former company from running its cars over the tracks of the latter. The case was set for May 28, but was continued until June 18, on stipulation of counsel, so as to avoid going over the entire grounds twice, thereby saving considerable time, for, according to the rules, it would be necessary to have a full presentation of arguments and affidavits on motion for a preliminary injunction, and repeat the process on the motion for a permanent injunction. Both sides seem anxious to have the case settled, so, if nothing further happens, it is likely to be heard on the date set, and will probably engage the attention of the court several days. Attorneys representing the Yerkes syndicate were in the court room to watch the progress of the case, as the Chicago General Company has announced that it will run its cars over the lines owned by the syndicate.

The Chicago City Railway Company in its answer makes a general denial of most of the points alleged in the bill filed by the Chicago General Company. The answer "denies the allegation in the said bill contained that this defendant has not fully or adequately performed and discharged its duty to afford proper transportation to passengers who desire to travel along said Twenty-second street; and also denies the allegation that it has only occupied said street and operated said railway thereon so far as it deemed necessary for the purpose of holding possession of the same and to exclude other common carriers of passengers therefrom, but, on the contrary, avers that it has at all times kept and maintained as full and adequate service upon the line as the proper accommodation of passengers required."

"Denies that it was ever understood that the tracks of the complainants should be connected with the tracks of defendant at a point near Grove street, or at any other point whatsoever; or that the expense of re-constructing its tracks in Twenty-second street should be borne by defendant; or that either of said defendants, in accordance with any understanding, proceeded to cause the necessary materials to be furnished and the necessary work to be done to reconstruct said east approach to said bridge for the relaying of the tracks and the making of such connection."

"Denies that there ever was any agreement between the complainants, or either of them, and the defendant, either expressed or implied, that the complainants or either of them, should have the right to operate railroad cars over and along the railroad tracks in any part of Twenty-second street east of the bridge."

"Denies that it is estopped from questioning the right

of complainants, or either of them, to operate cars in Twenty-second street, east of the bridge."

"This defendant further denies that the said complainants, or either of them, have any right under or by virtue of section 12 of Article 11 of the constitution of this state, to run any of its cars over any of the tracks of the defendant.

"Denies that the complainants, or either of them, are authorized by any ordinance of the city of Chicago to connect their tracks with the tracks of the defendant in Twenty-second street without the consent in writing of the defendant, and this defendant denies that it has ever given any consent to the making of such connections.

"The company admits that it has refused to permit the said complainants to run any cars over the tracks of the defendant in Twenty-second street east of the Twenty-second street bridge; and that it has by force prevented such use of its tracks by the complainants as it lawfully might do.

The City Railway Company upon information and belief avers that the West and South Towns Street Railway Company since its leases of its railways to the Chicago General Railway Company, on or about the 3d day of April, 1894, as in said bill alleged, has not been and is not now engaged in the operation of any railway or in the running of any cars whatsoever. That the pretended transfer of the rights or privileges granted by the West and South Towns Street Railway Company to the Chicago General Railway Company is of no force or effect for the reason that any right or rights were not in law capable of being assigned or transferred to the Chicago General Railway Company by the West and South Towns Street Railway company.

The City Railway Company further denies that either of the complainants are entitled to the relief, or any part thereof prayed for in the bill of complainants. The City Railway Company is represented by John P. Wilson and Judge Julius S. Grinnell, and the Chicago General Company by Peck, Miller & Starr and C. C. and C. L. Bonney and Lyman M. Paine. Attorneys who were in the court room say the case hangs on the point of the existence of a contract between the two companies, permitting the west side cars to run over the south side lines. The Chicago General Company alleges the existence of such a contract, which its attorneys say can be proven, while the City Railway Company denies that any such contract exists or was ever made.

HAILING CARS FROM THE LEFT.

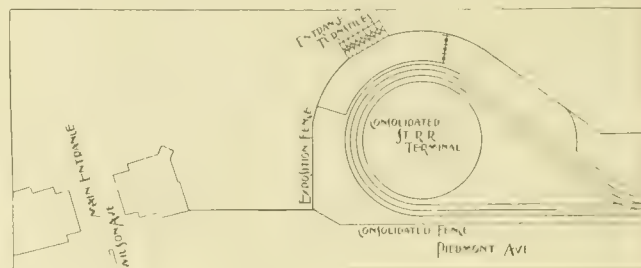
No heed is given to stop signals from persons on the left side of the car by motormen or conductors on the Carrollton Railroad, New Orleans, under strict orders from the management. Signals from the left are not only annoying to the motorman but are a cause of delay in waiting for the passenger to walk around the end of the car. When boarded in this manner, there is considerable risk of the passenger falling as he grasps the rear rail on the dash board.

ARE NOT RAILWAY MEN.

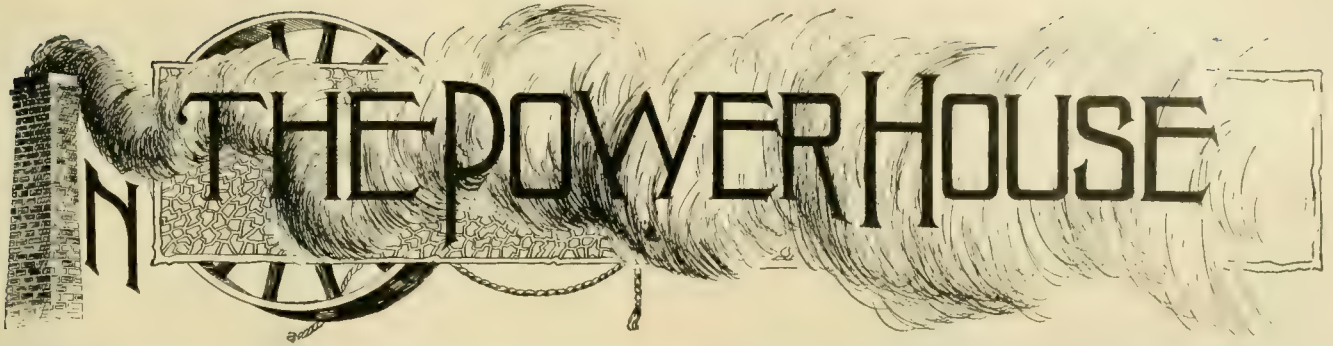
The remarkable ignorance which some purely electrical papers display regarding railway matters was excellently illustrated a few weeks ago by a prominent electrical paper while undertaking to sum up the advantages of a certain device for working controller and brake by the same handle. We do not wish to be understood as criticising the device, but simply as calling attention to the remarkable arguments urged in favor of it by the electrical paper in question. "Under the present system," says this journal, "the waste by motormen using brake and power at the same time is claimed to be enormous, amounting in some cases by actual experiment to 20 and 25 per cent of the power required to run the car." Is it? It is a wonder that this enormous loss which is taking place every day on the electric railways of this country has not driven them all to bankruptcy. We had been innocent enough to suppose that it was only the ignorant, uneducated motormen not fit to be trusted alone that would apply brakes with the current turned on. But the richest gem of all is yet to come, and is as follows: "Brake shoes are renewed every fifteen or twenty days under the present system, while with this device their life is extended to two or three times that length of time." We do not know what species of electric road our contemporary is acquainted with but it must be one of the kind that operates with the brakes set twenty-four hours in a day. The roads that we are acquainted with, and the roads to which the STREET RAILWAY REVIEW is a welcome visitor, renew brake shoes only about once in five months to a year. It is very possible, however, that those who are not within the STREET RAILWAY REVIEW fold may have to renew brake shoes every twenty days, and do many other things, which are the results of mossback mangement.

ATLANTA EXPOSITION TERMINALS.

The transportation facilities of the street railways of Atlanta, Ga., will be taxed to their utmost during the coming Cotton States Exposition. To care for the great crowds the Consolidated Street Railway Company will



build two distinct lines from the center of the city to the exposition grounds. A depot will be erected near the main entrance in the form of a circle, around which all of the exposition cars of the company will pass. The expense will be \$100,000, and 8,000 persons per hour can be carried.



This department is devoted to the construction and operation of electric railway power houses. Correspondence from practical men is specially invited. Both the users and makers of power house appliances, are expected to give their views and experiences on subjects within the range of the department.

Special efficiency tests are all right in their place but for all commercial purposes it is better for a plant to keep fairly accurate records of the work done every day rather than confine all efforts to a hair splitting 24-hour test once a year. Nevertheless special 24-hour tests are a good thing and should be made in all plants at intervals.

The efficiency of a power plant is likely to get mixed up with the efficiency of the system outside of the power plant unless the engineer asserts his rights. The cost of power per car mile is an item which ought to be known but it does not give the efficiency of the power plant because it involves the efficiency of the whole system, including overhead and return circuits and motors. Neither does it take into account the weight of the cars. The total efficiency of a power plant should be measured by the energy that passes out through the switchboard.

The street railway power plant of to-day probably represents the highest type of steam engineering. While they are not the most economical class of plants they have to face the most trying conditions and the only reason they can not make the very highest efficiency records is because of the variations in load. As stations and units grow larger however the efficiency of the steam plant is brought higher and higher. In producing engines and boilers to meet the demands of varying load and still maintain a reasonable economy, our manufacturers have accomplished the most difficult work yet undertaken.

If an understanding could be reached between street railway power house engineers as to the manner in which records should be kept in street railway power house work, it would be a great help in comparing the performances of different plants, and one of the prime objects of keeping records is for comparison. Hardly any two companies have the same way of keeping power house records, unless it be the companies that keep no

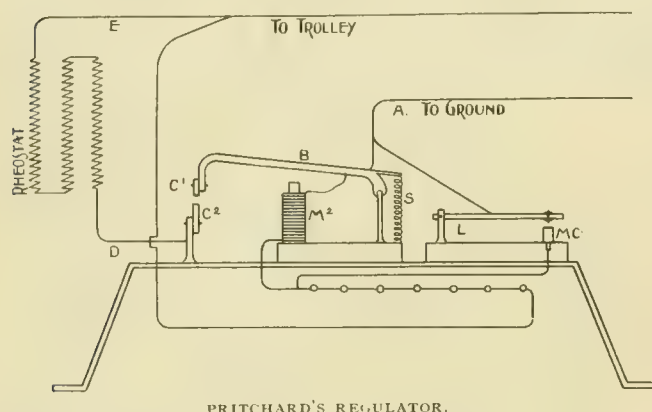
records. Although these latter companies may be in agreement, their method is hardly to be recommended. Figuring results in expense per car mile is not a reliable basis for comparison, but it may give some valuable hints, and ought to be always done. There is, however, a difference in opinion as to what should be done with trail car mileage. Some calculate a trail car mile as half a motor car mile; others figure it as equal to a motor mile, and others figure only in motor miles. The coal consumption per horse-power-hour is another item that is figured in several ways. Probably the best way to calculate results is in coal and water consumption per kilowatt-hour or per electrical-horse-power-hour at the switchboard, and per indicated horse-power hour at the engines. Very few plants take indicator cards often enough to be of any value in keeping records, and it is better not to give results in indicated horse-power rather than guess at what it ought to be from the switchboard readings. Results of that kind are of no value, and are simply misleading.

The cable power plant of the Sutter Street Railway in San Francisco probably gets its condensing water from a greater distance than any other street railway plant in the world. The water is piped five miles from the ocean to the power plant. After use in the condenser it is piped to the Lurline baths near by, at a temperature of 100 degrees Fahrenheit. The piping of the water is done by the Olympic Salt Water Company and the Sutter Street Railway pays for its use in the condensers. The daily output is 300,000 gallons a day. The arrangement is one mutually agreeable to the street railway and salt water company and may be a suggestion of what can be done elsewhere.

Pritchard's Regulator for Use With Water Power.

One of the most active men in the field of street railway generator speed regulation, in connection with water power, is F. E. Pritchard, superintendent of the Oswego Street Railway. We show here one of his latest improved regulators. The principle of this regulator is that of cutting in artificial resistance to put a load on the generator when the railway load is light, thereby keeping the generator load and speed constant. In the accompanying sketch, which represents one section of the regulator, a wire is run from the positive bus bar

and connected through a series of incandescent lamps, and the magnet M 2 to the ground. The magnet M 2 attracts B and operates the contacts C 1 C 2, which cut in and out the rheostat. When M 2 is not energized the spring S, holds the armature away. On a separate



block is a centrifugal governor which operates the lever L. This lever operates a mercury cup contact m c, which short circuits the magnet M 2. When the load is heavy, m c is let down to make contact, the magnet M 2 is short circuited, and the rheostat is cut out. As the speed rises, m c opens, and the current again flowing through m 2, throws in the resistance. There are a number of these regulators, and the adjustment of them is such that they are cut in, one after another, as the speed rises. The one now in operation at Oswego has five sections and governs two D 62 generators. It regulates to within 10 per cent in ordinary use, and can be adjusted to a five per cent variation, if it is thought necessary.

* * *

New Power Plant at Syracuse.

The Syracuse Street Railroad Company, in the new power house which it has just completed, has followed



CONVENIENT COAL STORAGE.

out its established practice in all construction, of combining as many elements as possible conducive to economy and ease of operation. The plant is located near the centre of the company's system on the banks of the Erie canal. It is a compound condensing station capable of



POWER HOUSE SYRACUSE STREET RAILROAD COMPANY.

developing an output of 1,200 horse power, and embraces some features in design, which, though they can hardly be called new, are still found in comparatively few of the street railway stations to-day. It was thought advisable, after the site had been selected for the buildings, to drive a double row of piles down to hard pan as a support for the masonry of the foundations; large sixteen inch piles spaced three feet centres being used as a support for the stack. The result has shown the wisdom of this course. The settlement of the stack has not been more than $\frac{1}{8}$ inch, and of the buildings none at all. The engine house is a building 70 by 55 feet, in dimensions, and contains the engines, generators, condensers, air and circulating pumps, with a ten ton traveling crane traversing the length of the building. The engines are vertical compound of the marine type, and were manufactured by the Cleveland Ship Building Company of Cleveland, Ohio. Their cylinders are $16\frac{1}{2}$ by 31 inches by 24 inch stroke, with a speed of 150 revolutions. The exhaust from each engine is received by a surface condenser of the type manufactured by the South Brooklyn Steam Engine Works, and having a cooling surface of 760 feet. A water circulation is maintained and a vacuum kept up by duplex combined air and circulating pumps, manufactured by Worthington, and having steam cylinders 9 inches in diameter; circulating and air cylinders $8\frac{1}{2}$ inches diameter by 10 inch stroke. Running condensing, each en-

gine is capable of exerting at a boiler pressure of 125 pounds a continuous duty of 400 horse power. Belted directly to each engine is a multipotat generator of the type manufactured by the General Electric Company, and having a capacity of 300 kilowatts. These generators are provided with 42 inch pulleys and will carry a load of 550 amperes at a voltage of 550 running at a speed of 400. They have given excellent satisfaction since their installation, and would appear to be rather under than

The boiler house is located just ten feet from the engine house, the space in between the two buildings being walled up and utilized for washroom, oil room and hot well. Occupying the southern half of the building and extending in a line east and west are a battery of four return tubular boilers. Just east of these and in line with them is the stack 170 feet in height, and one other boiler of the same capacity. Fuel is conveyed into the house by means of a trestle eight feet high, extending the length of the



INTERIOR POWER HOUSE SYRACUSE STREET RAILROAD COMPANY.

overrated. The current from the generators is controlled by a panel switch board consisting of three panels of the regular generator pattern, and three feed panels for the control of the six different sections on the line. By the use of this switch board not only can any generator or combination of generators be thrown in operation, but any portion of the line can be separated from the rest at the power station, should a short circuit or ground occur. It is regarded as highly important by the company's engineer that every part of the system should be under control from one central point, and that point, naturally, the power station. Twelve lines of 0000 copper feed leave the station to supply the circuits at various points, seven feeding the trolley and five the rail. An automatic circuit breaker protects each trolley feed line, together with an independent lightning arrester of the swinging ball pattern. A single pole switch and ammeter are also in circuit with each trolley feed, by the aid of which it is possible to arrive at a conclusion as to just what amount of power each section is taking.

An abundance of water is at hand for condensing purposes, and the elevation of the circulating pumps above water level being only a few feet, the cooling off of the condenser tubes is accomplished with a very small outlay of steam. Connection is also made with the condensers through a meter to the city water works, from which source water may be drawn for condensing purposes, should the other supply for any reason run dry. The inlet pipes into the large cistern which receives the water first before it goes to the condensers, are set so deep down, however, and are of such capacity (three 10 inch iron pipes) that so long as there is twelve inches of water, it may be utilized in creating a vacuum.

house in front of the boilers. Over this the freight cars are run and their contents dumped to the boiler house floor below. The coal is then shoveled direct into the furnaces. This method of providing has proven thoroughly successful, inasmuch as it saves practically one handling of the coal, and the consequent expense attached. The ashes are conveyed out of the house by a small tram running directly in front of the boilers.

The question of boiler feed was found to be a serious one when the power house was first projected, and quite a little study and thought was given to it. The water at certain times of the year is highly impregnated with mineral, scale-making salts, and as the efficient treatment of this condition was recognized as essential to the success of the plant, measures to insure a total prevention of deposit were adopted. The condensed steam from the engine exhausts is collected in the hot well after first being carefully filtered through a filter designed for the purpose, having for a filtering medium common excelsior, and from the hot well it is pumped into the boilers. In this way nearly all the boiler feed water is the condensation from steam and is, therefore, free from all mineral impurities. A small percentage of outside water is used to make up for what



H. S. NEWTON.

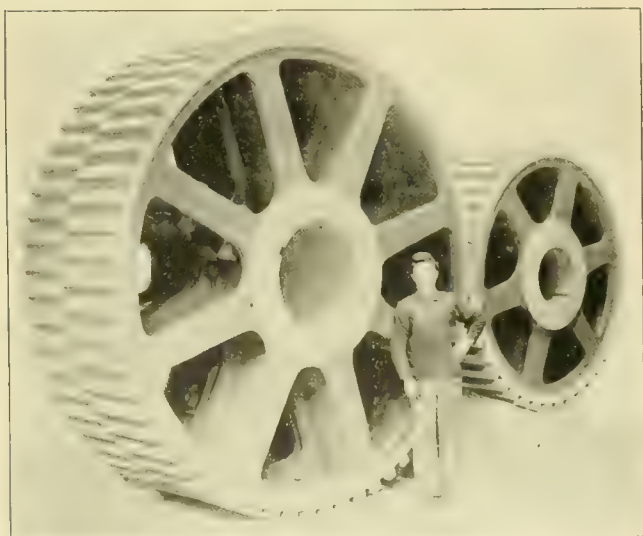
steam is dissipated from the exhaust of the steam cylinders of the air and circulating pumps through the heater. This extra feed water is first evaporated by a live steam evaporator adapted to the purpose and in its purified state goes into the hot well from whence with the water of condensation from the condensers, it is pumped into the boilers. The boilers are supplied by duplicate pumps manufactured by Worthington, either of which is of capacity sufficient to supply the entire plant. A mixture of equal parts coking bituminous coal and anthracite dust is used for fuel with very good results. The contractors for the building were James Stewart & Company, of St. Louis. G. H. Kimball, of Cleveland, acted as consulting steam engineer.

H. S. Newton, the resident engineer, under whose direction the construction work on lines and power house has been carried on, is a graduate of the Ohio State University from the department of electrical and mechanical engineering. Leaving college in 1889, he went to the Thomson-Houston factory at Lynn, and during his stay there did important work in connection with the design of the first single reduction motor, being for a year and a half in the railway experimental department. He also did some "trouble hunting" in electric plants in New England. In 1891 he went with the Central Thomson-Houston Company and while with this branch installed the roads and extensions at Marion, Ind., Springfield, O., Newark, O., Lexington, Ky., and other points in the central states. In 1892 he was electrical engineer during construction at Wheeling, W. Va. In 1893 he accepted his present position of chief engineer at Syracuse.

* * *

Big Gears for a Cable Plant.

The Chicago City Railway has just been putting in some massive gears in its largest cable driving plant at



BIG GEARS FOR A CABLE PLANT.

State and Twenty-first streets. There are four sets driving the four cables run by this plant. The gear wheels have 62 teeth with a 6-inch pitch. The pitch diameter

of the gear is 118 $\frac{5}{8}$ inches and its width 40 $\frac{1}{2}$ inches. The pinions have 42 teeth with a 6-inch pitch and a pitch diameter of 80 $\frac{3}{8}$ inches. They are steel castings with cut gears. The weight of a gear and pinion combined is 24 tons.

METAL VS. WOOD TIES.

Bulletin No. 9, of the Department of Agriculture, reviews at some length the question of metal ties, and, while the editor's intentions were evidently to treat the subject in all fairness, the report as published is not altogether reliable and accurate. For instance, in the case of the Daniels steel tie, an engineer's report is quoted to show the tie inadequate to the requirements of traffic. But, unfortunately, the report used dates back some time, and is on some of the ties first turned out during its experimental stage. The makers quickly discovered its weakness and at once perfected the weak points, so that the tie produced for the past year is in no respect amenable to the faults cited. The report also states, it is necessary to place the metal ties 15 inches center to center, and cites Terre Haute street railway as proof. The facts are, the metal ties in Russell B. Harrison's tracks at Terre Haute are laid to 24-inch centres, except a few feet on the Y leading out of the car house for special curve and crossing work. In New Castle, Pa., and Cincinnati, the metal ties are laid to 36-inch centers and although used under heavy traffic, show a better track than the track on each side of them where wooden ties were laid at the same time.

NEW USES FOR OLD CABLES.

The Market Street road, San Francisco, has discovered a new use for worn out cables. Old rope is cut into lengths short enough to melt in a small cupola, and from it are cast carrying pulleys and even sheaves of 30 inches diameter. A curious feature of the casting is its extreme brittleness; a sharp, sudden blow from a hammer causing the pulley to fly into fragments just as glass would do. On this account it is necessary to cast the pulley on its axle instead of boring and inserting the shaft, as is the usual method. Although the castings are so easily broken they last fully as long in service as the ordinary iron pulley, while the wheel being of the same metal as the rope it carries, affords an ideal surface for the rope to run upon. The experiment is well worth trying elsewhere, as the problem of disposing of worn out ropes has always been one in which the supply was fully up to the demand, and there have seemed few purposes to which the old ropes could be put, either in their natural state or by melting.

Examinations for admission to the freshman class of Lehigh University will be held June 21, 22 and 23 at the rooms of the Western Society of Engineers, Chicago, under the direction of H. F. J. Porter, western representative of the Bethlehem Iron Company.

THE INTER-URBAN ELECTRIC RAILWAY.

Abstract of a Paper Read Before the Cleveland Electric Club, May 22, '95, by S. H. Short.

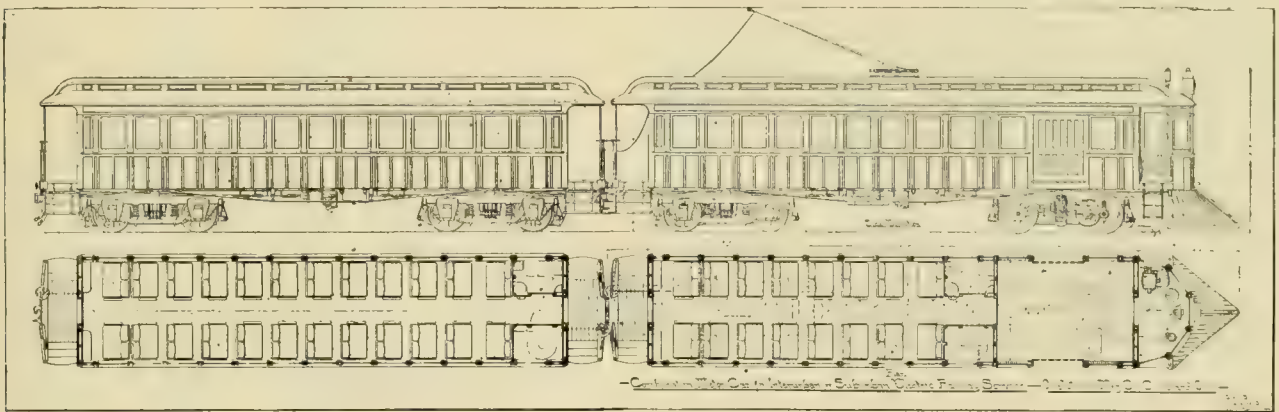
Students in political economy deplore the tendency of our people to congregate in or immediately around cities, but the practical street railway man sees right here one of the greatest fields for his work, with the best promise of the great profits for which he is always looking. Every city of more than 50,000 inhabitants, has just beyond its limits, within a radius of fifty miles, a large population more or less dependent upon it for business and supplies. These hangers on are more apt to form their own little communities and villages than to be entirely isolated, and these settlements are universally upon roads which furnish a comfortable means of access to the common center. The steam railroads have long since catered to these "outside citizens" with local trains running at short intervals during the busiest portions of the day; but this service being expensive and limited, has not quite satisfied the American people who want to go just when they please, as rapidly as possible, and for as small a sum as may be. Into this ready-made business the interurban railway companies must step, with all the accommodation of a street railway—cheap fare—frequent stoppages—and more frequent trains—greater cleanliness and even higher speed than the steam roads. This service will be found to be of mutual benefit to both city and surrounding country. It has often been proven in street railroading that an increase in the num-

with the rails far above the surface of the road, which keeps them clean and dry, affording good traction and a smooth rail. As much care should be taken in holding the rails at the joints and upon the ties, as though steam passenger trains were to be operated on the line. When a single track road is constructed, sidings should be provided, not only for the passing of trains, but occasional ones where cars may be left for light freight or market produce. These sidings should be provided with the latest and best automatic switching devices, or lock switches with signal targets and lamps attached. Where very high speed is to be maintained, or the trains to be frequent, a double track throughout should invariably be constructed, for, while the outlay at first may seem very large, the greater convenience, safety and efficiency obtained will soon repay the additional cost.

The overhead trolley wire with the ordinary under running trolley is undoubtedly the only method to be considered for supplying the car with current. The wire should be of large size, certainly not less than OO B & S. It should be held by flexible supports. The same poles can be used to support the supply wires, and telephone and signal lines for the convenience of those operating the road.

Regular stopping places should be provided along the railway line as it would be out of the question to stop wherever signalled. Shelter should always be provided at these stations, and they can be lighted from the trolley wire.

When the interurban road enters large cities with existing street railway lines, it is generally possible to make a traffic arrangement, whereby trains can be run directly into the heart of the city. This should be done, as it avoids discomfort and the delay of a transfer of passengers.



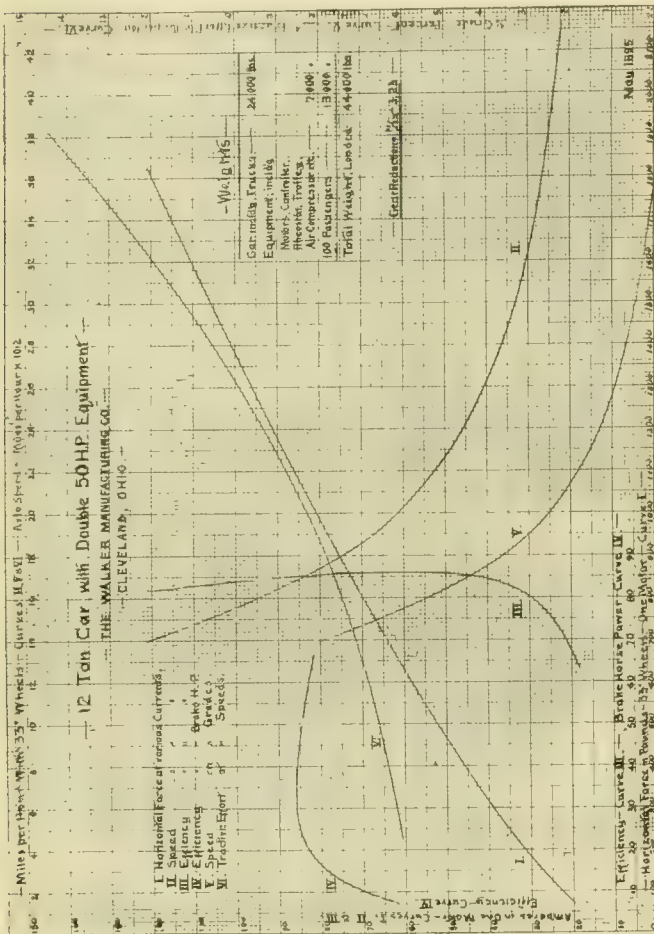
ber of trains has brought out an immediate and entirely disproportionate increase in the travel.

That the electric railway, when properly constructed and operated, is best adapted for this interurban service, is fast being acknowledged by all classes of railway men, and the eagerness of capital to invest in such undertakings is growing daily. I therefore propose to discuss the various points developed in this new branch of travel, from the side of the practical working; making an effort to care for both the comfort of the passengers and the assets of the company. After selecting the country through which an interurban railway is to be run, the point of next greatest importance is, where the road bed should be constructed. There are two possible locations, one along the existing common highway connecting the termini of the road, the other over a private right of way similar to a steam railway. Each has a number of points in its favor, and generally local conditions must be considered in making a decision. The latter is most tempting in its freedom from obstructions consequent upon the general travel of a highway; the power to establish the grades and curves, and chiefly the liberty to maintain a high rate of speed. It will be most advantageously used when the road is intended to operate between a few stations at considerable distance apart. But in most cases it will undoubtedly be best to adopt the public highway, as along this road will be found the greatest number of people, and upon them the success of the road depends.

In the construction of the road I would advocate as few grades, (never exceed 5 per cent or 250 feet per mile) and curves as possible, owing to the high rate of speed which it will be necessary to maintain, but always keeping near the highway. The roadbed itself should be prepared according to the best received practice in steam railway construction—ties close together—a sixty or seventy pound rail and stone or gravel ballast,

The rolling stock equipment for the interurban electric railway requires most careful and intelligent consideration. The requirements differ so greatly from ordinary street railway customs that we have little to guide us save steam railway practice. I will therefore endeavor to place before you information gained from the use of electric motors for tractive purposes, and apply it to the new condition met with in this class of work. In almost every case the interurban road enters into competition with some steam railway, and is therefore called upon for the same or better service—so high speed is the first requirement. The cars should be built like those found most practical for passenger coaches on steam roads. The body should be about 40 feet long—50 including the platforms; mounted on double swivel trucks which have 33-inch or 36-inch wheels with wide tread and deep flanges. The wheels should all be of the same size and the trucks centrally pivoted so the weight will be equally distributed on all the wheels. The trucks should be provided with both elliptical and spiral springs as on all high speed coaches. Such a car will seat 50 passengers, hold 100, weigh empty, about 12 tons, and about 22 tons when filled with passengers and fitted with its electric equipment of two 50-horse power motors. This car will run at a speed of 35 miles an hour on the level, and make a schedule time of 25 miles including stops and slow speed on curves and grades. The motors should be mounted one on each truck. The controlling apparatus should consist of the ordinary series parallel controller, worked by hand, and an air brake outfit of the regular Westinghouse type, with an air compressor operated by a separate motor automatically controlled by the air pressure. Believing it to be absolutely necessary to use air brakes on these high speed cars and trains, we have designed an air compressor with a special small motor to be placed in the motorman's cab. When the air pressure reaches a point below normal in the main reservoir, the current is automatically turned on, and the

motor pumps in air till the pressure is restored; then the current is cut off from the motor. This air pressure may be made to operate a signal whistle, and to force water from a tank under the car into wash basins, closets, and drinking faucets.

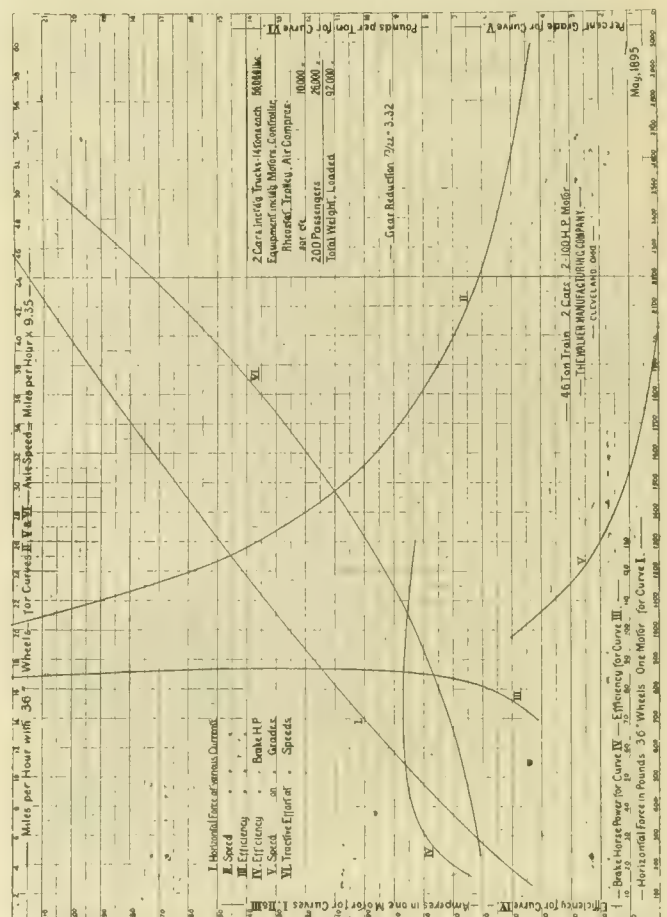


Many roads are now being projected and built, like the branch lines of the Pennsylvania Railroad and New York Central Railroad upon which the traffic will require a train of two or more cars, and a speed of from 40 to 45 miles an hour must be maintained on a level with a fully loaded train, in order that a schedule time of 35 miles per hour may be

12 Ton Car with Double 50 H.P. Equipment					
— Weight Complete, Loaded = 22 Tons					
THE WALKER MANUFACTURING CO. CLEVELAND, OHIO.					
% Grade	Speed Miles per Hour	Total Current	H.P.	Efficiency	Horizontal Force (lbs.)
0	35.5	54	28	77.7	294
1/4	29.5	67	37	82.3	460
1	25.6	83	47	84.7	670
1 1/4	23.1	97	55.5	85.6	886
2	21.4	110	63.4	86.0	1090
2 1/4	20.0	123	70.6	86.0	1300
3	19.0	134	77.2	86.0	1500
3 1/4	18.2	146	84.0	85.8	1710
4	17.5	158	90.6	85.6	1935
4 1/4	16.9	169	96.7	85.2	2150
5	16.4	180	102.2	84.7	2360

46 Ton Train — 2 Cars — 2-100 H.P. Motors					
Each Car Empty (exclusive of equipment) — 14 Tons					
THE WALKER MANUFACTURING CO., CLEVELAND, O.					
% Grade	Speed Miles per Hour	Total Current	H.P.	Efficiency	Horizontal Force (lbs.)
0	40.5	136	75.8	83.3	700
1/4	34.8	169	97.2	85.7	1052
1	30.7	205	119.0	86.7	1452
1 1/4	28.0	240	139.4	86.9	1860
2	26.0	273	159.0	87.0	2280
2 1/4	24.4	307	177.0	86.4	2710
3	23.2	341	195.0	85.8	3166
3 1/4	22.2	374	214.0	85.3	3600
4	21.2	408	231.0	84.6	4074
4 1/4	20.4	438	246.0	83.8	4510
5	19.6	470	260.0	82.8	5000

made. Figure 2 illustrates our standard train of two cars designed for interurban service. This train is composed of a combination car provided with two single reduction 100-horse-power motors and is arranged with a baggage compartment large enough to receive the baggage, mail, and express matter which these interurban trains must carry. The rear half of this car is set apart for the accommodation of about 35 passengers and can be used as a smoking compartment.



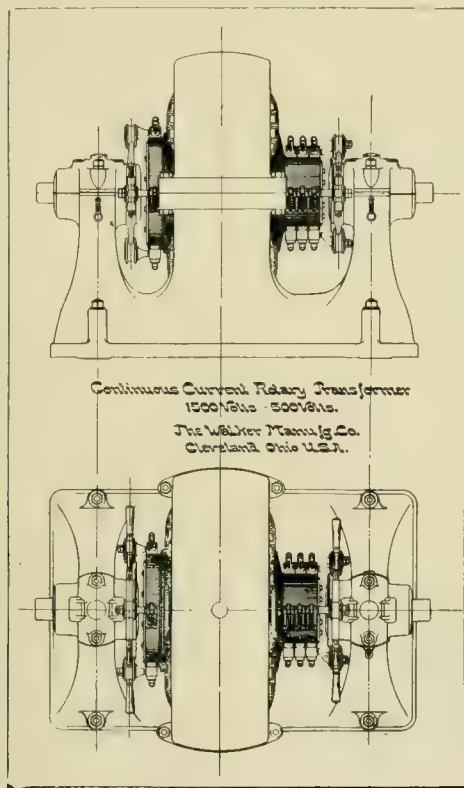
The front platform of the combination car is enclosed to form the motorman's cab, and in it are placed the air compressor, engineer's brake valve, controller, auxiliary hand brake and whistle valve.

The rear coach or trailing car is an ordinary passenger coach of about the same length as the motor car, and must be attached to it by the most modern automatic couplers. Air brake cylinders and attachments must be provided. Each car in this train will be about 50 feet over all, making a train length of over 100 feet and having a total weight of about 46 tons when fully loaded with 150 passengers and about 7,000 pounds of baggage.

The train should be lighted thoroughly with incandescent lamps, and the interior finish should be of good quality and attractive. The entire train is heated by electricity directly, or probably more economically by hot water obtained by immersing resistance coils in water tanks provided for the purpose.

Trains of more than two cars, of heavier cars, or requiring higher speed, must have larger motors preferably of the gearless type, but for such work as specified, the single reduction gear motors are best adapted. All motors should be as nearly spring mounted as possible to save destructive blows upon rail joints and wheels.

Engineers in dealing with problems in inter-urban railways should exercise the greatest care in making out specifications for cars, motors and generating plants, as there has been very little data obtained from larger motors than the so called 25-horse-power machine, and their



performance on ordinary street railways. I take the liberty to present a number of facts gleaned from our own experience, and all conformable with regular practice which may form a basis for all preliminary calculations. The standard motor will give its full rated brake horse-power for one hour without heating more than 150 degrees above the surrounding air. This motor will not run continuously doing this work without danger to its insulation, but it may temporarily, in starting or accelerating a train, take a 100 per cent overload without injury or sparking, while the efficiency at this extreme overload will remain high. Such are its peculiarities. In modern street railway service it has proven best to adopt two of these standard motors for operating one car. They are found to consume on the average about one-fourth their rated current and do the work easily without overheating. We therefore do not advise the adoption, for interurban trains, of motors of smaller capacity than will, with one-third their rated current, move the loaded train along a level track at the required speed, and the efficiency of these motors should be almost constant at from 80 to 90 per cent from one-third load to 50 per cent overload.

I give curves of efficiency, speed, horse-power, horizontal effort, etc., obtained from our standard 50 horse power and 100-horse-power motors. This data has been very carefully compiled from actual brake tests made on numbers of these machines and can safely be used as an accurate

basis for specifications. These results are not the highest which these machines will give, but are a safe average of hot and cold tests or about at the temperature at which the machines will run in service. We give also tables showing the performance of these motors with their trains on grades from level up to 5 per cent, which is the limit at which grades should be allowed. From these curves and tables approximate data for other conditions can be calculated.

Our last problem is that of the distribution of power to our railway system. It is seldom practicable to have more than one power station, so it is always best to place the station as near the center of the line as possible, and feed in both directions. Where the line is short and traffic not heavy this can easily be done, but when long, several methods may be used to maintain a constant E. M. F. The "booster" system is one which may be used where fuel is inexpensive, and consists in placing a small series machine on the long feeders, whose capacity is, just large enough to supply the losses and maintain a constant E. M. F. on the distant trolley. This may be carried to any extent, but is not economical, as the extra watts are all absorbed by the feeders and do no useful work. The alternating current method, by which the feeders are charged with a pressure of 2,000 volts or more, and rotary transformers used at intervals to reduce the pressure to 500 volts and change the current to a direct one, is very good, but the regulating apparatus is very complicated. A more direct and practicable method we believe is to have an armature wound for both 500 and 1500 volts, with a commutator on each side. This direct current transformer needs no separate exciter and can be so designed as to regulate for the drop on the trolley feeders, as the load comes on, thus maintaining absolutely the full E. M. F. so necessary for high speeds. I have recently designed machines of this character and believe they will give better results than any other method proposed.

I give a table comparing the amount of copper necessary in the feeders for a 50-mile road, running trains of two cars equipped with 100-horse-power motors, at one-half hour headway, eight trains in operation at all times, when fed from a central station at 500 volts by the old method, and with 1500 volts using sub-stations with these direct current transformers

RELATIVE AMOUNT OF COPPER REQUIRED WITH AND WITHOUT ROTARY TRANSFORMERS. ONE CENTRAL STATION.

Ordinary 500-volt transmission; copper = 100

2 rotary transformers, 1,500-volt transmission; copper = 48.7

4 rotary transformers, 1,500-volt transmission; copper = 23.3

6 rotary transformers, 1,500-volt transmission; copper = 13.9.

Figures are based on a 50-mile road, double track, 8 sixty-four ton trains, each equipped with 2 one hundred horse-power motors, schedule time 25 miles an hour, resistance of return $\frac{1}{3}$ of total.

The ideal system of transmission, however, is an alternating current on the feeders at high pressure, stationary transformers at regular intervals between feeder and trolley lines reducing the pressure to 500-volts and an alternating street railway motor on the cars. But this last is not yet forthcoming, and while it is possible to operate induction motors successfully, their tendency to synchronism renders them exceedingly low in efficiency when run at varying speeds and the controlling devices become very complex. However, we await the development of the motor which will enable us to extend our interurban railways into trans-continental lines, speeding from ocean to ocean at 100 or more miles per hour.

A FLOATING TABLE D'HOTE.

We had finished our soup and started on the fish, and the waiter was just bringing us some wine, a bottle of white wine for me and a bottle of claret for my right hand neighbor, when up spoke my right hand neighbor, though a stranger to me, and said: "I do enjoy these table d'hote dinners, and that's the reason I always come over from New York to Boston on these Norwich Line boats. Now, I'm a great diner at table d'hote places; I dine in them in Boston, though to be sure there are only three or four there, and I think I have dined in every one of them in New York, where there must be a good round hundred. They just suit me, as I work hard through the day and want something to eat after the day is over. If I go up the Sound in one of the other boats where you dine by card—so much for every dish—heavens! it costs me more for my dinner than it does for the ride; but when I come up this way I get just as good a dinner as I can get at any table d'hote place in New York, and it's only 75 cents, with a quarter more for a pint of excellent claret, and I always pay the quarter. I tell you, when a man travels a lot as I do he has to look after the comforts, and he has to keep down the expenses; and he can do both of these on the boats of the Norwich Line; then they are the fastest boats that go up and down the Sound."

ONLY TWO COPPERS TO A CAR.

John N. Beckley, president of the Rochester Railway Company, has solved the problem of free riding for police and firemen in the following order to conductors: "Within the city limits of Rochester, and not elsewhere, you are to allow two members of the regular police force of the city in blue uniform, two members of the paid fire department of the city of Rochester in blue uniform, and conductors and men in uniform and wearing badges to ride free. Park policemen, protective policemen in gray uniform, Charlotte policemen, constables, and deputy sheriffs and all other persons are not to be allowed to ride under any circumstances, except on the payment of their fare by cash, ticket or pass duly issued to them. Any conductor who violates this rule hereafter will be summarily discharged."

In some localities the police at certain hours of the day make such free use of the cars, that there is no room for paying patrons, who are either compelled to stand, wait for another car, or walk. There may be some good reasons for permitting the defenders of the peace and the fighters of fire to ride free, but there is an old saying about "riding a free horse to death" that might be appropriate in this connection. In most cities these officials receive good pay, far better than many regular patrons of the street railways, who can ill afford 10 cents a day out of their scanty earnings for car fare. It is also a question if the services of the police and fire departments as a whole are worth what they cost to the street railways. There may be individual officers who render necessary services at crossings that would otherwise compel the employment of a man, and an officer riding on a car may

protect the property of the street railway company, the sympathy of the rank and file of the police is usually with the employees and not with the company.

BENEFITS THE POOR MAN.

In starting the street railway mail service in Chicago, Postmaster Hesing said it would be of greater benefit to the poor man than to the rich. The latter was able to pay a special messenger when he wanted a letter delivered in a short space of time, but the poor man who could not afford messenger service, would by the street rail-



UNITED STATES STANDARD STREET RAILWAY MAIL CAR.

way postoffice be able to have his letter go from one end of the city to the other, and be delivered as quickly as the special messenger of the rich man could deliver his message, while the cost would only be the price of a stamp.

The standard street railway mail car, which before the year is over, will be in use on most of the larger street railway lines is as large as the first steam railroad post-office was at its beginning, which was not many years ago. The car shown in this connection is the same described with plans on page 296 of the May REVIEW.



POST OFFICE COMPARTMENT.

PASSENGER COMPARTMENT.

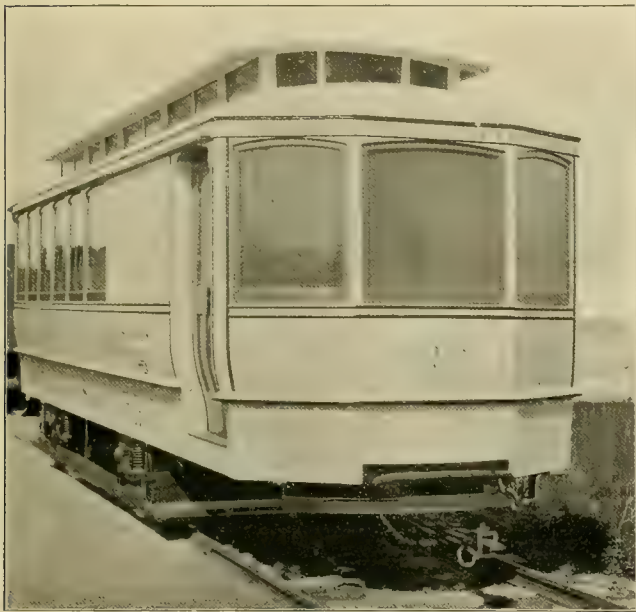
be of use in assisting a conductor to quell a disturbance, but an officer would be bound by his oath to do his duty under these circumstances, even if he paid his fare. In cases of labor troubles, and they are called upon to pro-

It is 30 feet long, with one platform 4 feet 6 inches, and has two compartments, one for passengers and the other for the mail service. The car is used as a second trailer by the West Chicago Street Railroad Company, the pas-

senger end being the front end of the car, so that only one conductor is needed for the two trailers. The car runs for eight hours, making four round trips, each of which requires two hours.

All mail matter is sorted in the car for the carriers in the Chicago postoffice as well as the three branch offices on the west side, which the car will specially serve, thereby saving from one to eight hours in the delivery of mail. The sorting cases contain 176 boxes and are reversible, being taken out and turned around when the return trip is made.

The method of handling the mail in the car is exactly the same as that followed in the regular railway mail service. There are three mail clerks assigned to duty.



END VIEW UNITED STATES STANDARD STREET RAILWAY MAIL CAR.

Two of them sort and distribute the mail as it is received, while the third puts it into the proper sacks, seeing that they are properly secured. Sacks containing mail from outside points are not resorted at the central postoffice, the mail being forwarded to its destination as made up in the car. That for other sections of the city will be tied up in appropriate bundles and from the car sent to the proper substations for delivery without rehandling at the central office.

It is the intention of the postoffice officials to have built additional cars, and extend the service to all of the street railway lines in the city, and eventually to have a car run from the northern limits to the southern limits over the tracks of four different street railway companies and serving 10 stations.

The views show the exterior and interior of the car which was built by the Pullman Company and is mounted on a Brownell truck. The two views on the left show the front and rear ends of the interior of the mail compartment, and those on the right, like views of the interior of the passenger compartment.

A MODEL INTER-URBAN CAR.

A PAPER READ BEFORE THE CLEVELAND ELECTRIC CLUB,
BY W. E. HAYCOX, PRESIDENT THE FULTON
TRUCK & FOUNDRY CO., MANSFIELD, OHIO.

The object of my paper is, the consideration of some points that may possess merit in the construction of a model interurban car. This car should be constructed vastly different from the city street car, inasmuch as it is intended for a different service. Would it not be well to examine in what particulars the two cars should differ? First, the city street car is designed for the convenience of passengers only, while the interurban car should be designed for the convenience of passengers and the conveyance of mail, express, baggage and light freight such as butter, eggs, milk, fruit and garden products.

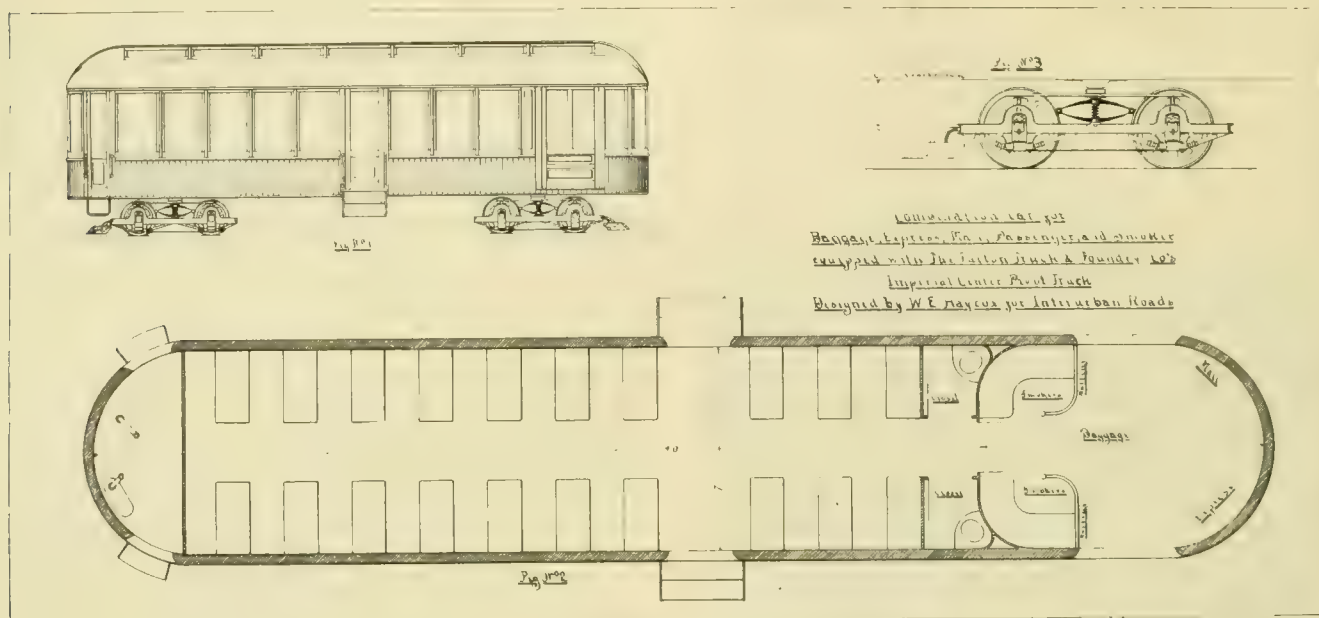
Your attention is called to Figure 1 on the blue print which is an elevation of a car designed by the writer and may possess features suitable to meet the above requirements. This car has vestibules on both ends and is designed to run in one direction with a loop or Y at each end of the road. It is provided with transverse seats with an aisle in the center and a door on either side in the center of the car for the ingress and egress of passengers. The baggage, express, mail and smoking department is partitioned off from the main body of the car and has doors on either side for receiving and delivering such matter. Figure 2 is a plan of this car, and will aid in presenting the main features embodied in its construction.

On the interurban road it is desirous to cultivate and encourage the use of the line for the transportation of mail, baggage, express and light freight, and in many cases it will be found that the source of revenue derived from this branch of the business will be greater than that from the passenger service. If this be true, then is it not more important to provide as frequent service and as good accommodations for the transportation of such light freight as it is for the convenience of passengers on a road of this character? By the use of a car similar to this design, as frequent service and as good accommodations may be given to this part of the business as to the passenger service. There are many interurban roads operating an independent baggage and express car, but so few trips are made that a large portion of the business is lost from the fact that better accommodations can be had by express wagons and other conveyances. Therefore, instead of building up a handsome and profitable business in the transportation of such freight, it is often diminished by poor service to such an extent that the operation of a baggage car becomes a source of expense instead of a revenue. It also needs an extra crew for the operation of a separate baggage and express car.

By using a combination car similar to my design, the conductor can act as the baggage and expressman and as this compartment of the car is located at the rear end, it gives him an opportunity to watch his passengers and at the same time attend to taking on or delivering such baggage or express as needs his attention.

The baggage compartment is provided with accommodations for smokers, which is a necessity in the operation of a road of this character. There is a portable railing to separate the smoker from the baggage car and on occasions where there are large crowds, the baggage

installed since the first of the year to operate wood working machinery, bicycle repairing machinery, type setting machines, pumping machinery, sewing machine factories, bottling machinery, sausage machines, and rubber making machinery.



car may be used entirely for passengers by removing a railing and substituting camp chairs that may be carried for occasions of this kind. And again, should the baggage, express and light freight be so great that the entire compartment is needed to be used, the railing can be removed and the smoking compartment utilized for the transportation of such freight and baggage. Figure 3 is an elevation of our imperial center pivot truck, specially designed for interurban cars.

Its main frame is an I beam section and is a steel casting of a soft grade of open hearth steel. The frame is substantially trussed and is provided with a combination elliptic and coil spring on either side. The king bolt is ball bearing and has a link motion and the weight of the car is placed in the center of the truck. The sides are provided with rubs which come in contact only when rounding curves where the track is elevated on one side or on uneven track. By this method it allows the truck to conform to the track without tipping the car body in any way.

POWER IN SAN FRANCISCO.

Electricity as a motive power is making great strides in San Francisco. In addition to the street railways and lighting plants, there are 600 establishments which are equipped with motors for running machinery. The extension of the conduit system has brought an increased demand for motors for running elevators, and many minor manufacturing plants have ceased to use their engines and boilers, for they have found it more economical to put in motors and lease power. Motors have been

BICYCLES AS REVENUE PRODUCERS.

William McKenzie, president of the Toronto Railway Company, Toronto, Ont., has hit upon a plan for using the bicycle to create travel on the company's cars. Along the Lake Shore Line, outside the city limits, on which there is only a half hour service, the company has allowed bicyclists to construct a cinder path, simply for their own convenience, as well as giving the company better ballasting on the road. The riders of the wheel in Toronto number about 10,000. The only revenue the company expects to receive on account of the path is from the wives and families of the riders who take the cars to watch the wheelmen practice.

STRIKE OF CAR MEN AT PARIS, FRANCE.

The Paris omnibus and street car employes went on strike recently. An exciting meeting of the strikers ended in a characteristic French ebullition. The men rushed out of the hall shouting: "Death to the scabs!" "Overturn the cars!" Many vehicles were upset and their drivers abused. The police dispersed the rioters, making several arrests.

Kate Field, in writing of women in street cars, suggests that every street railway company attach a school of etiquette to every car barn. "I would make an effort," she says, "to instill civility and alertness into my employes. It would pay and civility always pays, especially with women who have the honor of being ladies by nature."

VESTIBULE EQUIPMENT.

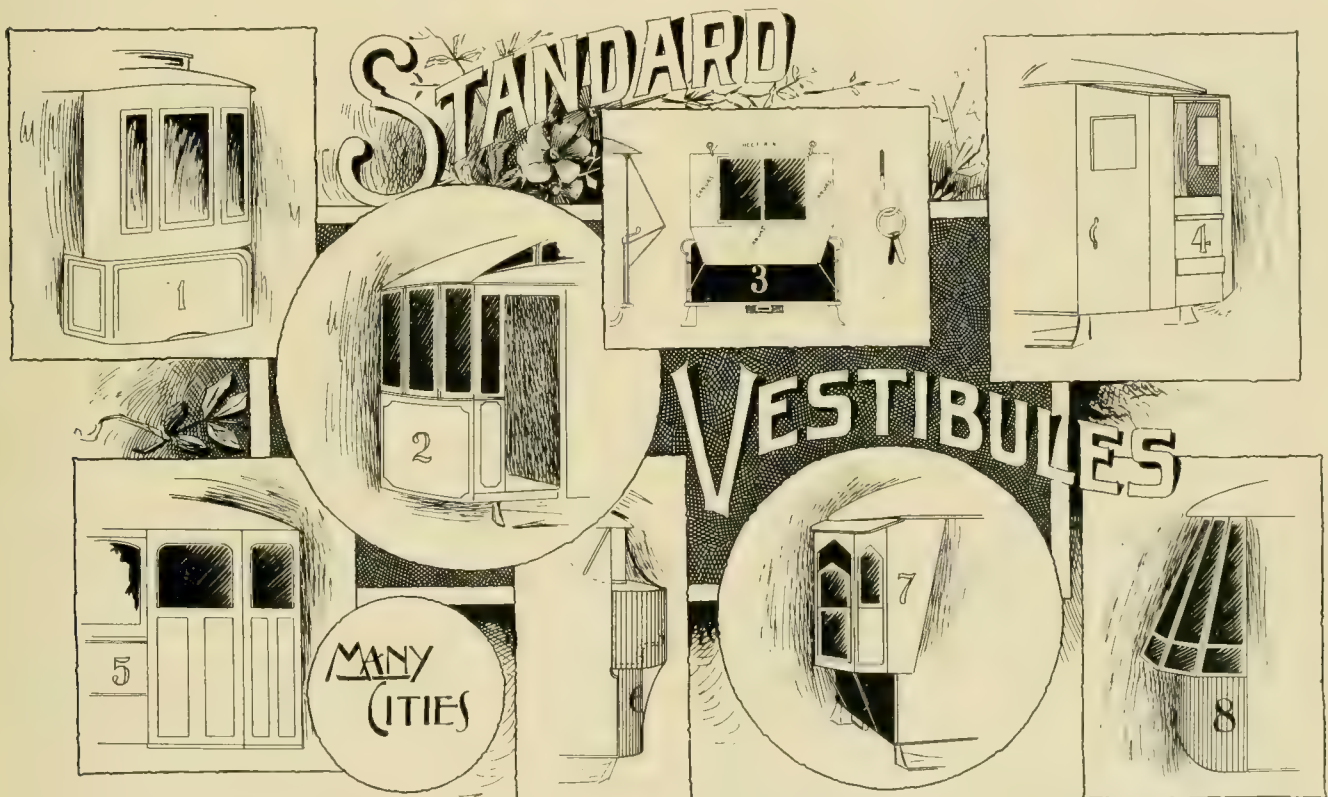
PART I.

Quite a change of opinion on the vestibule question has taken place during the year, yet all admit that the vestibule has its disadvantages, and it is a question whether they do not over balance the advantages. Experience has caused different managers to have different opinions, even in the same localities, one finding them to be of benefit and his neighbor condemning them as useless. The views of several managers on this subject are given below, while the engraving shows different styles of homemade vestibules that have been described in previous issues of this magazine.

The objections to the vestibule are set forth in the fol-

3. These vestibules would necessarily make accidents much more frequent than now, for the reason that the person controlling a car would be placed in such a position that in stormy weather it would be difficult to see in front of the car, and it would be impossible to see that persons had safely boarded the car before starting, and it would also be impossible for the person in charge of the car to look to either side of the car for the purpose of ascertaining whether the car could safely pass vehicles or obstructions close to the track.

4. They would prevent the person in charge of the car from seeing passengers coming from side streets, who wished to hail the car for passage, and this would be particularly true in stormy weather. It would also prevent the turning of a switch by the person controlling the motor power.



1. Springfield, O. 2. Jewett Car Company. 3. Toledo, O. 4. Vincennes, Ind. 5. Foster. 6. Laclede Car Company. 7. Youngstown, O. 8. Asheville, N. C.

lowing petition from street railway employees to the Colorado legislature, asking that a proposed vestibule bill be not passed:

1. The building of vestibules and requiring persons controlling the motive power of cars to work therein would endanger the safety of such persons in case of collisions, which are of frequent occurrence.

2. In case of sleet, snow or rain storms, or in extremely cold weather it would be impossible for the person in charge of the car to safely control the same without having the front windows of the vestibule down, so as not to interfere with his vision, and in such cases the storm would beat in upon him and the vestibule would not give the desired protection.

5. The brake now in use on electric and other roads is in form of a lever, upon which great power can be thrown to stop a car in places of imminent danger. It is most likely these brakes would have to be changed if the vestibules were used, and a brake of the character of that in use on steam railroads or a wheel-brake substituted. The same power cannot be used on this form of brake, and this fact is more apparent when it is recalled that on a street car rarely but one hand can be used in applying the brake.

6. On many cars it will be necessary to have the vestibule on each end of the car, and this would prevent the conductor from caring for the trolley-rope.

7. Many objections might be urged from the stand-

point of the public, such as the inconvenience (and in case of accident, perhaps the danger) of quickly alighting from cars, the inconvenience in boarding cars, preventing smoking on closed cars, slow running and the like.

8. The bill only excepts from its operation "waiting cars." Such a term is not used in street car business, and it is not known what is meant by the term. "Trailing cars" are demanded by the public in this climate, and they would not be used if this bill becomes a law.

In addition to the foregoing, we do not think it just to our employers, in these times of financial distress, when their business has suffered in common with all other business, that they should be required to expend the large amount of money necessary to comply with the provisions of this bill."

C. K. Durbin, superintendent of the Denver Tramway Company, writes: "I would be very glad to assist you in any way in directing the attention of street railway managers to the question, as we consider it one of great importance, and one which will continue to come up until satisfactorily settled. We had an unusually cold winter here, and that fact greatly aided the advocates of the bill. The bill, as presented to the legislature, is almost identical with the Minneapolis law, and was introduced and pushed by a committee of the labor union composed of the employes of the Denver City Cable Company. Our men were, for the most part, neutral on the subject, and did not say much either way. Such measures, of course, appeal strongly to the sympathy of the public. Notwithstanding all our arguments, it went through the lower house with a rush. It was, however, with much work, stopped in the senate.

OBJECTIONS IN PRACTICE.

"The principal arguments advanced by us in opposition to the bill, were as per the inclosed petition. We were greatly aided by the testimony of a motorman from Minneapolis, who happened to come here for his health while the bill was being considered. He appeared before the senate committee for us, and gave his experience, which was strongly opposed to the vestibule. He stated, among other things, that it seriously impaired the hearing of the motorman, it being almost impossible for him to distinguish the bells of the fire department when the windows are closed. He went on to say that it was necessary to lower the front sash during a snow storm, and consequently many colds were contracted by the men. During dry cold weather it would be very pleasant to be housed up; but a sudden exposure, occasioned by lowering the window during a storm, was very injurious to the health, and that the men who had at first considered the vestibule a godsend, now proclaimed it a curse. He, himself, contracted the asthma, on account of which malady he came to this climate.

"The question will undoubtedly come up two years hence, and in the meantime we propose to experiment somewhat ourselves and ascertain whether some temporary protection cannot be provided for the men during

very severe weather. I hope that you will draw out a very full discussion on the question."

Ross Mackenzie, general manager of the Niagara Falls Park & River Railway Company, writes: "We have very few vestibule cars on the road. The most of our cars are open motors. We find the vestibule cars in favor with some drivers on account of protection from weather; with others they are considered a nuisance on account of limited vision. We have not enough to give you a useful report."

BENJAMIN NORTON FAVORS THEM.

Benjamin Norton, Brooklyn, writes: "In my judgment a vestibule on electric or cable cars is a very advantageous thing. It not only protects a motorman in all kinds of weather, but it prevents draughts through the cars, and is much more agreeable to passengers. There is no question about it in my mind, that as the electric or cable car is now run it is a very severe position for a man to occupy for ten hours of the day, or night, without some sort of protection in front of him. My Newburgh line, on which we are operating about twenty cars, run nothing but vestibule cars during the winter, and I have found that the men can do much better work, and for longer hours even, if necessary, without the same strain that they would have were the cars not equipped with vestibules. Most of the roads object to them, I think, simply because of the expense in putting them on the cars, that is all. I should say most positively that I am in favor of vestibule cars every time. I am very glad to know that there is likely to be a law passed in this state compelling the companies to do this."

W. A. H. Bogardus, secretary and treasurer, of the Brooklyn Heights Railroad Company, writes: "The Brooklyn Heights cable line, $\frac{1}{2}$ mile long, has six vestibuled close cars. These cars run upon a street where the vehicle traffic is light, and the trip only takes a few minutes to make. We have found from experience with these cars, as well as studying the cars of other roads, that the vestibule is more disadvantageous than otherwise, is cumbersome, expensive to maintain, hinders the conductors and gripmen in the performance of their work, and is not necessary for the protection of passengers. Unless its doors are closed it protects no one except in storms coming either directly behind or directly in front of the car. We believe that its universal adoption on the cars of the systems of roads which we operate would increase the number of casualties and add largely to our cost of maintenance, and as we said before give no corresponding benefits."

A manager of a western road has this to say: "We do not use vestibules on our cars at present. Five of our cars were formerly equipped with vestibules, and we were forced to remove them. Our experience with them convinced us that they are a menace to the public life and limb. Anything that will obstruct the motorman's view ahead, or to the right or left, will increase the number of collisions and accidents. I am sorry to say that with most of us, using open platforms, our average of

accidents has been very high, notwithstanding the fact that our men on the front, have a clear range of vision. With the vestibules, during rain, sleet and snow storms, when motormen need the protection most, the view ahead is necessarily obstructed, and the liability of accidents thereby greatly increased. Our men preferred the open platforms as a matter of safety for themselves in case of a collision in stormy weather when the view ahead was obstructed, and after night fall, when the reflection of street lamps on the glass made the view ahead uncertain. The question of expense in placing the vestibules on our cars is a secondary consideration with us, as we feel that anything that will tend to lessen a motorman's labor and increase his comfort, will make his services more valuable to us. There are not over ten days during the intensely cold season when our men actually suffer from the cold, and I believe that they would prefer to clothe themselves and to meet this weather, rather than place themselves and the public liable to the accidents that the vestibule entails."

HAS CHANGED HIS MIND.

J. B. Hanna, secretary and treasurer of the Cleveland City Railway Company, tells of his experience as follows: "Several years since while the vestibule law was being agitated at our state capitol, I took part in trying to defeat the measure, representing our Cleveland Company and also in the capacity of secretary and treasurer of the State Association of Tramways. I believed from the best information I could obtain from theory, that the danger of operating rapidly moving cars in our large city with vestibules was too great to warrant a careful management adopting them, believing that to obscure the vision of a motorman or to so enclose him as to make it difficult for him to hear, would be simply to increase our accidents. We feared the result in frosty weather of a motorman's breath collecting on the glass in front of him, and to lower a window meant the loss of the protection desired to a large extent. I worked hard with others before our legislature, but the law was passed. While we were all in sympathy with the humanity feature of protection to our motormen, we all felt it was at too great a risk with property and life on the street to be a safe and wise law for the state to enact. But, as before stated, the law was passed in the late spring. It gave us until November to equip our motors under a penalty of a certain sum for every day for each car operated without a vestibule. This did not allow us any time in the proper weather to experiment with vestibules, and in seeking information from car builders the only answer I could get was not to think of putting them on at all. As citizens and as street railroad officials, we wanted to comply with the laws of our state. Some cars in our city were enclosed on the sides and partly in front, leaving the space directly in front of the motorman open, canvas being used for this vestibule with glass windows. Others were enclosed on the inside and the front with glass windows and solid work of wood or iron beneath to the platform, leaving a narrow open way from the

platform to the canopy above on the outside for motorman or passenger to get out of, the cars running from one end all the time, using a loop or Y at either end of the route. We find the canvas not a very satisfactory vestibule, although with the wind in certain directions they are really warmer than to have the side open. We find the glass front and one side protection the most desirable and are equipping our entire outfit in this manner. The one side being open, allows the motorman's breath to escape to an extent that it does not obscure his vision on the glass as badly as it would otherwise do, and is less of an obstruction to his hearing than if the entire platform were enclosed.

"I think we have had accidents which could be attributed solely to the vestibule. As to the necessity of protection, I think each section of our country varies as much as does the character of the surroundings of each road operated. In closely built up cities, it would seem that as much protection from wind and stormy weather was not required as in the open country traversed by suburban lines. Public opinion is very much in favor of their use with us. I would not enclose all sides of the platform, and when running altogether from one end, it needs but the front platform vestibuled, so that the expense is but one-half. I believe this manner of operating will be found to be satisfactory when tried. A loop or Y does not take up much room, while the advantages of having one controller, one sand box, one brake, etc., can be readily seen."

WOULD NOT FIGHT THEM.

A well known manager says:

"I do not care to injure any one who may differ with me as to the advisability of putting them on, but should any street railroad manager want an opinion, I say, without any hesitation, I should stop fighting any law that compelled their use, and use this money and time to equip with them. I fought our state law as hard as any one, and after two winters' experience I am heartily in favor of a vestibule with a narrow opening on one side. While I would rather run a motor car myself without a vestibule than drive a horse car with one, if that were possible, yet for all, I believe public opinion is tending strongly that way, and I think we will not lose anything by heeding it."

S. L. NELSON'S EXPERIENCE.

S. L. Nelson, general manager of the Springfield Railway Company, Springfield, O., writes: "In compliance with the laws of Ohio, we do use vestibules on our cars. From a humane standpoint, we have never been opposed to the use of vestibules, but when the legislature passed the law in this state, requiring us, on short notice, to vestibule our present cars without giving us an opportunity to experiment to some extent and ascertain just what kind of vestibule could be adopted, so as not to interfere with the successful operation of a car, or inconvenience its patrons, we all took the position that it was absolutely unfair. We have adopted three or four different styles of vestibules and at the present

time are equipping all of our cars with an iron vestibule which is cheaper, lighter and more durable and attractive than anything else we have tried. Some time ago we sent you a photograph of one of our first vestibules, (see No. 1) and when we get a little further along, will be pleased to send you one of our latest design. You will remember, perhaps, that we bought some experience in the courts on the question, and even at the present time the undersigned is booked as a "criminal," with three indictments still hanging over his head, so that we know from actual experience that a vestibule is a costly thing, even if not in all respects a desirable one. We do not object to being mentioned in connection with our opinion."

(To be continued.)

SNOW AT MUSKEGON.

In these days of increasing warmth it is refreshing to glance at the accompanying scene on the Sanford street line at Muskegon, Mich., on February 20. Superintendent F. W. Thompson, of the Muskegon Railway, had a



MAKES ONE FEEL COOL.

sweeper built in the company's shops which kept the lines clear, to the satisfaction of company and public. The sweeper is simply a box car with two sweepers, each driven by a 15-horse-power motor. It is pushed by a motor car. For very deep snow, wings are used, which shove the snow back 2½ feet from the track.

ROAD BUILDING IN MASSACHUSETTS.

Massachusetts is so much in the lead in the movement for good roads that other commonwealths are following the old Bay state in drafting the necessary legislation and arranging plans of operation.

The law enacted June 30, 1894, permits the mayor and aldermen of any city, and the commissioners of counties to petition the state highway commission to take roads as state highways. These roads are improved in the best manner by the state highway commission, who have a lump sum, appropriated by the legislature, to divide among the different counties at their own discretion. Taking the roads out of the hands of local authorities is

a wise step, for the local road commissioners have in the past proved themselves incompetent.

Good results have accrued from the new law. Already thirty-eight sections of road have been contracted for; eight of these will be 18 feet wide, all others 15 feet wide. As the primary object is to get length of way, the commissioners are considering the advisability of building single track roads in the thinly settled districts. These would not be over 9 feet wide, with portions of double width as passing points. The cost of 1½ miles of such road is less than the cost of a mile of 15 feet width.

NEW WESTINGHOUSE SHOPS.

The Westinghouse Machine Company is erecting new shops at East Pittsburg, Pa., for the manufacture of the Westinghouse steam engine. The construction of the main building of the new shops 602 by 230 feet, will be as nearly fire-proof throughout as possible. The structure will be of steel, inclosed by brick walls, slate roof, wire-glass skylight, etc. A building of similar construction, 200 by 60 feet, will contain the hammer shop and power plant.

Within the main building, through which switches are run direct from the main line of the Pennsylvania Railroad, will be the machine, erecting, and pattern shops, foundry, warehouse, offices, etc. Two crane runways, each of 60-foot span, on which electric cranes of the latest improved design will be used, extend the length of the building. The remaining space is taken up with galleries provided with lighter crane service. The present equipment of machine tools will be increased by the addition of whatever is best. The hammer shop will have every convenience that the best practice can suggest, for thoroughness and expedition. An 8-ton, a 3-ton, a 2-ton and several smaller hammers, with the usual cranes, will form its equipment.

By the removal of the Westinghouse Machine Company to East Pittsburg, where are also located the immense plant of the Westinghouse Electric & Manufacturing Company, and the factory of the Fuel Gas & Manufacturing Company, a concentration of the vast Westinghouse interests, is effected at practically one point, within a half hour's ride of Pittsburg, for the Union Switch & Signal Company's works at Swissvale, and the Westinghouse Air Brake Company's large shops at Wilmerding, are also near by. It is estimated that the new buildings alone will have cost \$400,000 when completed the coming November.

Andrew Radel has been elected president of the Bridgeport, Conn., Traction Company. As a practical street railway man Mr. Radel has few equals or superiors. His reputation is founded on his management of the Newark & South Orange Railway of which he practically took charge when 16 years old. His father bought the road at sheriff's sale for \$35,000, and sold it for \$1,500,000, after 15 years of his son's management.



Under the Greig system of light railways the cost is \$5,000 a mile outside of England, while in the latter country the cost is increased to \$7,500 to \$10,000 a mile, on account of preliminary Parliamentary expenses and increased cost of right of way. In South Africa, India, Australia, China, the Straits Settlements, West Indies, Sandwich Islands and other places, the gage is 2 feet to 2 feet 6 inches, the locomotives weighing 7 or 8 tons and can carry safely a load of 80 tons or so at a speed of 10 miles an hour. A light railway of still narrower gage to connect farms with a main line of light railway can be built for \$1,000 a mile and might prove of great benefit to farmers if there was plenty of produce to be carried. The illustrations show Greig & Beadon's patent light railway locomotive, Greig's patent light railway and rolling stock and a 2-foot gage line at Ackworth colliery, Northumberland.

Steam, gas, electricity and oil can be used to operate the engines. It is said that oil presents the advantage of freedom from noise, smoke and sparks, which is an important point when there are many stacks and hay fields along the line. Only one man is required to manage the engine, and, if the supply of oil runs short a fresh supply can be got at almost every village through which the line runs. A gearing arrangement has recently been patented, which regulates the speed and movement of the engine. A great deal of interest is being taken in light railways, but certain proposed speed regulations have hampered promoters in getting capital interested.

BRIDGE FIGHT IN PHILADELPHIA.

Not long after the famous struggle at Twenty-second street bridge, Chicago, the Philadelphia Traction Company and the Peoples Traction Company had a fight over the Girard avenue bridge, Philadelphia. The former company, acting under its charter rights, determined to perfect its trolley system by connecting its Jefferson and Master streets trolley with the Peoples' wire over the bridge. Each company had a force of 100 men. There were tower wagons, linemen, motormen, conductors and men from the shops. When the Philadelphia crew attempted to make a connection, there was a struggle, which was won by the invader. The victory was short lived, as a tower wagon of the Peoples' line was run underneath and an employe cut the wire. This

enraged Chief Engineer Uhlenhart, of the Mt. Vernon station of the Philadelphia Company, who ordered the linemen to make connections again.

Then came the final struggle. Quick as a flash the linemen caught hold of the wire and attempted to raise it in position. The Peoples' men proved to be the best tuggers, and the work was delayed for about five minutes. First the wire went to one curb and then back to the other. While the excitement was at its height a lineman of the Philadelphia Company made a connection with a live wire which caused everybody to drop it. The police came and a truce was declared, until the officers of the company could come to some agreement.

ONLY NEED ACCEPT LEGAL TENDER.

Conductors of street railways are not required to accept anything but legal tender. Walter W. Wood sued the Camden Horse Railroad Company for \$5,000 damages. He gave a conductor a \$5 bill, but the latter could not change it. Wood had no money of less denomination and refused to get off the car, but was ejected by the conductor. In cross examination of Wood, it was brought

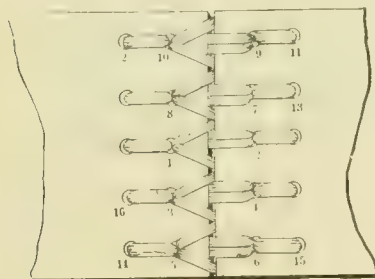


LIGHT RAILWAY.—ACKWORTH COLLIERY.

out that he could not tell what kind of a \$5 note he offered the conductor, whether it was a treasury note, a bank note, or a silver certificate. The attorney for the company moved for a non-suit on the ground that plaintiff had not shown that legal tender money was presented to the conductor. Judge Garrison granted the non-suit. He said the company would not be compelled to accept a promissory note, such as a bank note, and a silver certificate was not legal tender.

LACING BELTS.

Dynamo belts require very strong lacing, and as the generator pulley is of small diameter the splice is required to be also flexible. A writer in the American Machinist describes the splice which is here illustrated. This splice



possesses the merits of strength and flexibility. As it is laced on the hinge principle, it can work up and down for an indefinite length of time without becoming loose. Laced in the ordinary way belts are likely to give out

at any time, and most probably when traffic is heavy on the line and the cars are calling for the maximum current. A shut-down under such circumstances is costly.

Punch a row of holes about $\frac{3}{4}$ inch from the end of the belt with a No. 7 or 8 punch. Directly back of these make another row of holes with a No. 5 punch. Pare the ends of the belt to a feather edge.

The lace should be about $\frac{5}{16}$ inch in width. Begin lacing in the middle of the belt as hole No. 1, dividing the lace equally. Bring the lace up between the ends of the belt, pass down through No. 2, then up between the ends of the belt, down through No. 3, up between the ends of the belt, and down through No. 4, between the ends of the belt, and down through No. 5, up between the ends of the belt, and down through No. 6, again up between the ends, and down through No. 5, up through No. 14, down through No. 5, up between the ends, down through No. 6, up through No. 15, down through No. 6, up between the ends, and back to No. 3, down through No. 3, and up through No. 16, and continue in the same manner back to the middle of the belt.

With the other end of the lace begin at hole No. 1, pass it down between the ends and up through No. 7, down between the ends, up through No. 8, down between the ends, up through No. 9, down between the ends, up through No. 10, down between the ends, up through No. 9, down through No. 11, up through No. 9, down between the ends, up through No. 10, down through No. 12, up through No. 10, down between the ends, up through No. 7, down through No. 13, up through No. 7, and continue in the same manner back to the middle of the belt. The number of holes varies according to width of belt. With this splice very little lace is required, and once made it will last a long time.

TOY TROLLEY CAR IN COURT.

In the suit of Edmund Reeves against the Consolidated Traction Company, Hoboken, N. J., for \$142 as damages to a truck and piano, it was claimed by plaintiff that the car ran into the truck and by defendant that the truck ran into the car. For several days the lawyers argued, finally resorting to an object lesson, each side

taking into court a toy car and truck to show its view of the collision. The jury confirmed the verdict of the lower court in favor of the plaintiff.

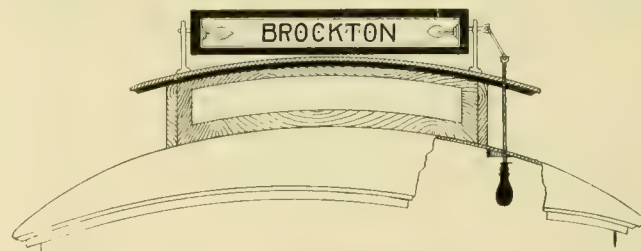
ELECTRIC TRACTION IN EUROPE.

There are 440.85 miles of electric roads in operation in Europe, using 18,150 kilowatts to run 1,236 cars, and there is building 134.16 miles of road. The following table compiled by L'Industrie Electrique, shows the distribution of the lines.

	IN OPERATION.			IN PROGRESS
	Miles.	Kilowatts	Cars.	Miles.
Germany	231.19	5,264	652	59.73
England	43.39	3,443	125	20.60
Austria	28.35	1,639	129	2.37
Belgium	12.71	1,130	48	
Bosnia				3.54
Spain	8.84	210	12	
France	60.78	3,610	152	29.05
Italy	11.90	870	33	14.40
Sweden and Norway	4.00	146	11	
Portugal				8.18
Roumania	3.43	140	15	
Russia	6.32	540	32	
Servia	6.32	150	7	
Switzerland	23.62	1,008	40	1.73
Total	440.85	18,150	1,236	134.16

FOR TURNING SIGNS.

E. J. Rauch, electrical engineer and master mechanic of the Brockton Street Railway, Brockton, Mass., has devised an arrangement for turning signs from the inside of the car that effects a small saving both in time and repairs. The accompanying drawing makes plain its mode of construction and operation. The device, as originally patented by Mr. Rauch and Mr. Keith,



FOR TURNING SIGNS.

employed bevel gears to turn the sign, but the latest improvement is the universal coupling shown. The conductor can turn his sign without stopping the car or even going outside. Another advantage is that the signs are not being knocked off the cars with turning sticks or having the letters at each end battered so that they can not be read. This alone makes an important saving in sign painting. A dial and index inside the car show the position of the sign.

Increased business has compelled the Wabash Railroad Company to find larger quarters for its Chicago ticket office. It is now pleasantly located at 97 Adams street in the fine, new Marquette building opposite the postoffice, and is handsomely furnished.



Interesting Bits of Information from all Parts of the Country,
Boiled Down for Busy Readers.

C. E. Long has resigned the position of Superintendent of the York, Pa., Street Railway Company.

E. H. Jennings, president of the Pittsburg & Birmingham Passenger Railway Company, of Pittsburg, Pa., has resigned.

Col. N. H. Heft has resigned the presidency of the Bridgeport, Conn., Traction Company, his other interests requiring all his time.

Daniel Christian, for two years assistant superintendent of the Neversink Mountain Railway, Reading, Pa., has been promoted to chief superintendent.

New Orleans aldermen are considering an ordinance limiting the speed of electric cars to six miles an hour, where the railway companies do not sprinkle.

A. S. Krotz, electrical engineer of the Springfield, O., Street Railway, is the inventor of the electrical quick firing gun which has been causing such a sensation lately.

The Edmondson Avenue, Catonsville & Ellicott City Electric Railway Company, Baltimore, Md., has elected George Yakel, president, Louis Yakel, secretary, and William Layfield, treasurer.

Carpeted and cushioned seats have been declared unhealthful by the city of Memphis, Tenn. The Citizens' Street Railroad Company was given 15 days to remove the carpet from its car seats.

Circulations, like metals, have their qualities and values. An ounce of gold is worth more than a pound of brass. A small ad. in a paper of high-class circulation is worth a page in a "cheap" sheet.—Printers' Ink.

Oil fuel is now so dear that the West Chicago Street Railroad Company has advertised for proposals to furnish 150,000 tons of coal. The company will abandon oil if asked to pay the higher prices ruling on the oil exchange.

Funeral processions must yield the right of way to street cars when both are moving in the same direction. At street crossings, however, cars and other vehicles must not hinder the passage of funerals. Judge Kimball has so decided in a recent case at Washington.

Augustus A. Bullet, claiming to be an electrical expert, testified in a damage suit in Brooklyn that he could stop a trolley car going fifteen miles an hour within ten feet. How would he do it? Throw a tie across the track,

probably; but then motormen do not carry ties on the platform for this purpose.

For refusing to deliver up his ticket when asked to do so by an inspector of the North Metropolitan Tramway Company, London, Eng., Arthur Knight, a passenger, was fined \$7 in the police court. When requested by the inspector to produce his ticket he said he had paid his fare to the conductor and thrown away his ticket, and would not pay again.

Several employes of the Ft. Wayne, Ind., Electric Railway Company, who were members of a labor union, were discharged. The county prosecuting attorney charged the directors of the company with violating the law prohibiting the discharge of employes because they belong to a labor union. On trial the law was declared unconstitutional by Judge O'Rourke.

Judges Dallas and Butler of the United States Circuit Court disagreed as to the right of the United States to take land owned by the Gettysburg Electric Railway Company. A jury of seven recently awarded the company \$30,000 damages for land taken by the government. Prominent Grand Army men are behind the government in its attempt to shut the trolley road off the Gettysburg battlefield, alleging that it would be a desecration. On the other hand the railway would make the scene of the great conflict more accessible to patriotic Americans.

Two young women boarded a car and found only standing room. One whispered to her companion, "I'm going to get a seat from one of these men." She selected as her victim a sedate gentleman who bore the appearance of a married man. Boldly she sailed up to him: "My dear Mr. Jones! How delighted I am to meet you! Will I sit down? Well, I do feel tired. Thank you so much for the seat." The sedate gentleman, a total stranger, looked, listened, then quietly rose and gave her his seat, saying as he did so: "Sit down, Jane, my girl; don't often see you out on washing day! You must feel tired, I'm sure. How's your mistress?" The young lady got her seat, but lost her vivacity. Her companion snickered.

Many summer cars are ready for shipment to New England at the shops of the Jackson & Sharp Company, Wilmington, Del. These cars have several new features. The steps along the side are hinged and fold up when not in use. A long bar of wood keeps passengers from alighting on the wrong side, and is raised and lowered at the will of the conductor by cords operated from each end of the car. Storm-proof curtains extend from the roof to the floor and are held at any desired point by a rack and pinion device invented by Elwood Jackson, secretary of the Jackson & Sharp Company. Under construction is a number of 40-foot combination freight and passenger cars, greatly resembling narrow-gage steam railroad cars.

SAFE ARRANGEMENT OF TRAILER PLUGS.

Very few consider the danger that lurks in the usual arrangement of plugs for connecting to the lighting circuit of trailers. With the majority of plugs in use there is a live end exposed so that when no trailer is attached and the trailer wire is coiled up on the hood a passenger standing on the platform can reach up and touch the live end of the plug. If he should have hold of the brake



handle at the same time he would receive the full 500-volts. The way out of this is very simple and has been applied on several roads. Just now it is being put on the cars of the South Chicago City Railway by C. T. Powell, master mechanic. He has also applied it on several other roads with which he has formerly been connected. The plugs on motors and trailers are concealed in blocks under the edges of the hoods, and there are no wires or plugs hanging from motor or trailer. To connect the motor and trailer a jumper is used which has a plug on each end as shown. This jumper is carried by motor-man or conductor.

SHE TOOK HIM FOR A LITTLE BOY.

There is a woman on the west side who still shudders when she thinks of a blunder she made one day last week in a Summit street car, says the Kansas City Star. She is an elderly woman, with sons old enough to attend the high school, and is of a mild and benign disposition. She does not see well without her glasses, and to this she attributes her misfortune.

About six o'clock in the evening she had a seat in a Summit street car. It was crowded with shoppers and men going home from work. Standing in front of her with his back to her the other passengers saw a very short man. He was having a very hard time keeping on his feet as the car lurched from time to time with the slack of the cable. He was too short to hold to the straps, and the best he could do was to hang to the man in front of him. A look of sympathy passed over the benign-looking woman's face as she witnessed his struggles. When the car reached the curve at the corner of Ninth and Washington streets it gave a frightful lurch.

The little man was taken off his guard and landed square in the woman's lap. He tried to rise as fast as he could and excuse himself, when, to his surprise and horror, he felt that she was holding him where he was. He tried again to get up, but she held him tighter than before.

"That's all right, little boy, sit still," she said, kindly, with a smile.

Passengers were staring in amazement at the unusual spectacle. The undersized victim continued to squirm,

but his captor attributed it to boyish embarrassment. Then he turned his big round eyes on her and said in a deep bass voice: "Will you be kind enough to let me go, madam?" Her confusion was painful to witness, and at the nearest corner she got out, her cheeks crimson with mortification. The short man took her seat, jammed his hat down hard over his forehead and buried himself in his newspaper.

SUPPLEMENTARY SEATS.

A Chicago man's scintillating intellect evolved during one of its most brilliant coruscations a method of doubling the seating capacity of street cars when required by the crowd. It is a wonder no one thought of it before.

As shown in our illustration, the invention consists of a second tier of seats above. Each seat slides up and down on two upright posts, independently of the others. When not in use it is kept near the roof, to be drawn down to a level with the knees of the person occupying the lower "berth," when desired.

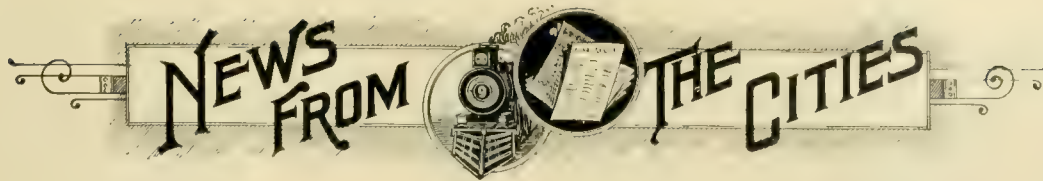
It is among the possibilities of the future to see a man in a crowded car reach up, grab one of these seats, let it drop to his knees, and ask a woman who is standing if she doesn't want to sit down. If she is one of the "new women" the gallant will be sat down upon. Of course, he will remain in his seat until the passenger on his knees reaches the end of her journey, unless, of course, she should allow him to escape.

A phonograph in a car of them might record something like this: "Well, are you through wiping your muddy shoes on my dress?" "Say, you, just lean forward a little, will you?" "Would you mind standing up a minute while I draw a new breath?" "If you hit me on the face again with your elbow I'll break this seat over your head." "Get off my fresh shine."

There are all sorts of possibilities in the contrivance. The dramatic incidents in every crowded car equipped with this invention will be well worth the price of ten fares.

William Clayton has resigned the position of superintendent of the Mobile, Ala., Street Railway Company. Before returning to his home in Memphis, Mr. Clayton was presented with a handsome meerschaum pipe by his admiring employees.





Alabama.

MONTGOMERY, ALA.—The mortgage on the Montgomery, West End & Riverside Electric Street Railway Company, in favor of the State Trust Company, New York, has been foreclosed.

PHOENIX CITY, ALA.—The Phoenix City Railway Company has been organized to construct an electric line between this city and Girard. The officers are said to be the same as those of the Columbus Railroad Company, Columbus, Ga.

Arkansas.

LITTLE ROCK, ARK.—J. H. Healy has applied for an electric street railway franchise.

LITTLE ROCK, ARK.—The Little Rock Traction Company has elected Allen N. Johnson, president; George B. Rose, secretary; Charles F. Penzel, treasurer. Mortgage bonds will be issued to take up the indebtedness of the old company.

LITTLE ROCK, ARK.—The Little Rock Traction & Electric Company has been incorporated in Boston to control all the street railway properties, which were bought recently by Henry C. Haarstick, St. Louis. It is said to be composed of the United Electric Securities Company, Boston, and the General Electric Company.

California.

SACRAMENTO, CAL.—L. T. Hatfield has applied for a street railway franchise.

NAPA, CAL.—L. Crothwell, San Francisco, has applied for a franchise or 27 miles of electric road to Calistoga.

RIVERSIDE, CAL.—The Riverside & Arlington Street Railway Company has absorbed the Eighth street line.

OAKLAND, CAL.—It is reported that the Consolidated Piedmont Cable Company will construct 15 miles of electric line.

LOS ANGELES, CAL.—Herman de Laguna has petitioned for an electric railway franchise, which requires the building of a bridge.

HAYWARDS, CAL.—Daniel Chisholm and H. L. Petermann have been granted a franchise for an electric line to Redwood Canyon, Mt. Eden and Petermann's Landing.

Canada

OSHAWA, ONT.—Ahearn & Soper, Ottawa, will equip the electric street railway now under construction.

NIAGARA FALLS, ONT.—The Niagara Falls, Wesley Park & Clifton Tramway Company will adopt electric traction. C. Black is superintendent.

PORT ARTHUR, ONT.—W. P. Cooke, chairman of the committee of the town of Port Arthur, operating the electric street railway, is in the market for complete electric lighting plant, 15,000 to 30,000 candle power; dynamos and generators, material for 1½ miles of electric road, and one or more second-hand fast motor cars and open trail cars.

LONDON, ONT.—The London Street Railway Company is in the market for 40,000 cedar ties, 7 feet long, 6 by 6 inch face; 300 tons 56-pound T rail, including fish plates, bolts and spikes; 2,000 tons 70 pound grooved girder rail, with necessary fish plates, bolts and spikes; 9 miles single "o" hard drawn trolley wire; 9 miles "oo" trolley wire; 9 miles insulated "oooo" feeder wire; 150 iron poles; 800 wooden poles, 28 feet long, with 7-inch diameter at the top for wooden poles and 6-inch diameter at top for iron poles, if round; 25 motor cars and car equipments with necessary trucks; 2 electric snow sweepers; 1,000-horse power steam plant with necessary boilers, piping, etc. Generators have been purchased.

Chicago.

CHICAGO.—The Siemens & Halske Company of America has increased its capital from \$1,000,000 to \$2,000,000.

CHICAGO.—It is reported that the Lake Street Elevated Railroad Company has entered into a contract with the West Chicago Street Railroad Company for electric power.

CHICAGO.—The Chicago, Lemont & Joliet Electric Road has been incorporated with \$300,000 capital, by E. H. Heilbronn, S. T. Hart, E. D. Hopkins, G. Lawrence Taylor, D. C. Baldwin.

CHICAGO.—The Chicago & Worth Street Railway Company, Tacoma building, has applied for a franchise to construct and operate a street railway by cable, electric, compressed air or gas motor.

CHICAGO.—The Columbian Construction Company, contractors for the Northwestern Elevated, offers \$2,000,000 in bonds to stockholders at 90 with a stock bonus. It is expected to raise \$1,800,000 in cash to continue the work.

CHICAGO.—The Suburban Electric Railway Company has applied for a franchise in the town of Cicero, and, it is reported, will construct a line from Riverside. James W. Kenney and Homer L. Galpin, Tacoma building, are interested.

CHICAGO.—The Chicago Subway, Arcade & Traction Company has been incorporated to do away with the present surface lines in the center of the city. Capital, \$15,000,000; incorporators, Charles F. Griffin, Marvin E. Barnhart, attorneys, Tacoma building; W. H. Passmore, real estate; George M. Baumann, commission merchant; John R. Nelson and W. B. Roberts.

CHICAGO.—The Suburban Electric Railway Company has completed its incorporation, and is authorized to construct an electric line from Chicago to cities and villages in Cook, Lake, Dupage and Kane counties. The capital stock is \$1,250,000, and the incorporators, George I. Talbot, DeKalb, Ill., James W. Kenney, Oscar L. Murry, Homer K. Galpin, J. S. McGlashan, Chicago, most of whom are in the Tacoma building.

Colorado.

PUEBLO, COL.—The Pueblo City Railway Company will be sold to satisfy a mortgage of \$500,000.

DENVER, COL.—The Citizen's Railway Company has been incorporated with \$500,000 to operate street railways in Arapahoe, Jefferson and Boulder counties, by Milo A. Smith, Charles E. Hawver, E. Smith, S. C. M. Cobb, T. W. Porter, all of Denver.

COLORADO SPRINGS, COL.—The Three Cities Electric Company has been incorporated with \$100,000 capital to build an electric line connecting Colorado Springs, Colorado City and Manitou, by A. A. McGovney, A. L. Lawton, E. J. Eaton, all connected with the Colorado Springs Rapid Transit Railway Company.

Connecticut.

UNIONVILLE, CONN.—The Suburban Electric Railway Company will extend its line from Farmington to Plainville.

HARTFORD, CONN.—The Hartford Street Railway Company has applied for a franchise to double track and extend its lines.

BRIDGEPORT, CONN.—Percival Kanauth, representing creditors, paid \$60,000 for all the foreign and native patents of the Waddell-Entz Storage Battery System, and the entire storage battery equipment at the Second Avenue Railway Company's stables, New York. Montgomery Waddell, one of the inventors will be retained to carry on further experiments.

Delaware.

WILMINGTON, DEL.—The West Chester & Wilmington Electric Railway Company has been incorporated, and may connect with the Wilmington City Railway Company.

REHOBOTH, DEL.—The Henlopen Electric Light & Railway Company has applied for a charter with \$250,000 capital; incorporators, Hiram R. Burton, H. V. Lyons and others.

WILMINGTON, DEL.—W. B. Carswell has completed the survey for the Wilmington & Brandywine Springs Electric Railway Company. The road will pass through Elsmere, Greenbank or Marshallton.

District of Columbia.

WASHINGTON, D. C.—J. P. Clark, president of the Washington & Great Falls Electric Road has secured a franchise. The company will apply to the District Supreme Court for a capitalization.

GEORGETOWN, D. C.—The Bethesda Electric Railroad Company has given a mortgage for \$25,000 to secure the American Security & Trust Company, Georgetown, Aldis B. Browne, Washington, and James B. Henderson, Rockville, Md., are interested.

Georgia.

ATLANTA, GA.—The Atlanta Street Railroad Company, of which Aaron Haas is president, has been granted a franchise.

ATLANTA, GA.—The Atchison Railway Electric Line Company has applied for a receiver for the Lithia Springs Company.

ATLANTA, GA.—R. D. Fisher, W. C. Shaw and Henry Hilkins, Baltimore, representing bondholders, bought the Atlanta Traction Company for \$150,000.

SAVANNAH, GA.—The receivers of the City & Suburban Railroad Company have been discharged, and the road turned over to President J. H. Johnston.

ATLANTA, GA.—The Atlanta Consolidated Street Railway has secured a franchise to extend its Peachtree street line to reach the exposition. Aaron Haas has also been granted a franchise. E. B. Rosser, Dayton Hale and others also secured franchises.

Illinois.

ELGIN, ILL.—The Dundee Rapid Transit Company has moved its principal office from Dundee to Elgin.

MOMENCE, ILL.—An attempt is being made to organize the Momence, Lowell & Crown Point Electric Railway Company.

PEORIA, ILL.—The Central Railway Company, electric, contemplates a double track extension and the construction of a steel bridge.

BLOOMINGTON, ILL.—P. P. Mast, a well-known capitalist of Springfield, O., contemplates building a street railway in Bloomington.

ELGIN, ILL.—The Dundee Rapid Transit Company has reorganized, with D. E. Wood, president; J. T. Jencks, secretary, treasurer and manager.

ANNA, ILL.—The Citizens Electric Light & Street Railroad Company has been incorporated with \$12,000 capital by Christian, Charles V. and John G. Nording.

DANVILLE, ILL.—W. S. Mathias has given up his project for an electric line to Hoopes-ton and instead will build to Potomac, where the citizens are offering inducements.

SPRINGFIELD, ILL.—The Canales Trolley Company has been incorporated with \$100,000 capital to obtain patents and manufacture trolleys, by F. W. Canales, Adam M. Ross, T. Henry Pearse.

BELLEVILLE, ILL.—Local capitalists have secured control of the Belleville Electric Railway Company, the option of G. W. Atterbury having expired. It is said John A. Day has acquired a controlling interest.

ALTON, ILL.—The Alton Horse Railway & Carrying Company has made an arrangement to lease power from the Alton Electric Street Railway Company, and the line will be constructed for electric traction.

HOOPES-TON, ILL.—John L. Hamilton, Jr., James H. Dyer, M. R. Clark, James A. Cunningham, A. H. Trego have organized the Hoopes-ton Electric Railway Company, to build to Gilman, Sheldon and Cham-paign, Ill., and to Indiana Mineral Springs, Ind.

Indiana.

SOUTH BEND, IND.—The bondholders have bought the South Bend & Mishawaka Street Railway Company. J. McM. Smith will remain as manager.

HAMMOND, IND.—The city council has granted a franchise for a new line to Roby to the Hammond, Whiting & East Chicago Electric Railway Company.

LOGANS-PORT, IND.—Snow & Avery have been granted a franchise by the Commissioners of Howard county for an electric road from Kokomo to Green'own.

SHELBYVILLE, IND.—K. M. Hord, B. S. Sutton, E. K. Adams, Batesville, and others are organizing the Baltimore & Oldenburg Steam & Electric Railway with \$100,000 capital.

FT. WAYNE, IND.—A. B. White is promoting an electric line from Ft. Wayne to New Haven. County assessor Heath is interested in a proposed road from Ft. Wayne to Maysville and Hicksville.

GREENWOOD, IND.—The Indianapolis, Greenwood & Franklin Electric Railway Company has completed its incorporation and is to begin construction. Grafton Johnson, Henry Smith and J. R. Langsdale are directors.

MICHIGAN CITY, IND.—The Michigan City & Laporte Street Railway Company has been incorporated with \$10,000 capital, by N. Tuthill, A. G. Tillotson, A. I. Nichols, J. F. Gallaher, E. G. Blinks, to build an electric railway in Laporte.

VALPARAISO, IND.—The Hobart & Western Electric Railway Company has elected the following officers: A. Morrison, Chicago, president; Seward Lightner, vice-president; A. J. Smith, secretary; J. H. Roper, treasurer. Work may begin in July.

MARION, IND.—W. E. Avery, superintendent of the Kokomo Street Railway Company has been granted franchises over the turnpikes to Greentown, 9 miles from Kokomo, and to the Grant county line. The company has the contract for lighting Greentown and will furnish 25 arc lamps.

INDIANAPOLIS, IND.—The Indianapolis, Anderson & Marion Railway Company has been incorporated with \$500,000 capital, to operate an electric road in Marion, Hancock, Madison and Grant counties, by N. J. Clodfelter, Crawfordsville; A. B. Wilgus, J. D. Lindsay, New York; V. C. Kent, A. M. Painter, Alexandria; Leon O. Bailey, W. R. Myers, Indianapolis.

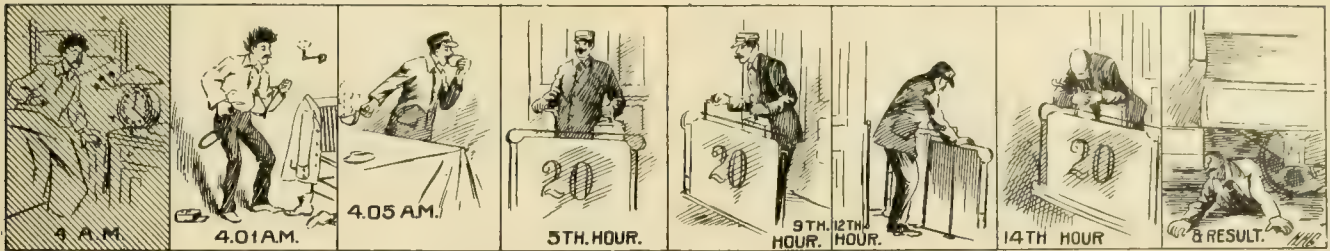
ANDERSON, IND.—The Indianapolis, Anderson & Marion, Electric Railway Company has filed a bond of \$5,000 with the city, and let contracts for construction of the section from Anderson to Marion to A. B. Wilgus and associates, Potter building, New York, for \$395,000. It is said the St. Louis Car Company has the contract for motor cars. September 15 is the date set for the completion of the line.

Iowa.

OSKALOOSA, IA.—The Consolidated Street Railway & Land Company, operating a small horse line, contemplates converting to electricity and extending to Beacon and Carbonado.

BURLINGTON, IA.—J. J. Ransom, J. T. Remy, Col. G. H. Higbee, Burlington, and Walsh Bros., Clinton, have organized to build five miles of electric road from Burlington to West Burlington.

MUSCATINE, IA.—Paul B. Seevers, superintendent of the Muscatine Electric Railway Company, is preparing plans for the improvement and extension of its electric lighting plant. It is estimated that \$60,000 will be expended.



PHILADELPHIA ENQUIRER'S CONCEPTION OF A MOTORMAN'S DAILY LIFE.

SIoux CITY, IA.—The Sioux City Cable Railway Company has been ordered sold to satisfy a \$350,000 mortgage held by the Manhattan Trust Company, New York. Claims for supplies and labor amounting to \$5,000 have precedence over the mortgage.

FT. MADISON, IA.—John Walljasper, auditor of the board of supervisors of Lee county, will receive bids for building, all the iron and wood bridges necessary to be built the current year. Iron bridges are to have spans not less than 50 feet.

Kansas.

KANSAS CITY, KAS.—The Kansas City & Northern Railway Company has applied for an electric street railway franchise.

TOPEKA, KAS.—The Topeka Electric Railway Company has been incorporated with \$75,000 capital by C. M. Crawford and J. P. Walsh, Chicago; A. J. Arnold, T. M. James, Louis Stair, F. C. Downey, M. T. Campbell, Topeka.

KANSAS CITY, KAS.—Lightning caused a fire which damaged the power house on the West Side Railway Company's power house, \$20,000, burning offices and machine shop and two cars. The engine, generators and boilers were saved although they received a soaking.

Louisiana.

NEW ORLEANS, LA.—Capt. Thomas Pickles, owner of the Algiers & Gretna Railway Company, has asked permission to adopt electric traction.

BATON ROUGE, LA.—All the property and franchises of the Citizen's Electric Railway Company have been sold by the Bank of Baton Rouge to the Home Electric Company, composed of local capitalists, for \$40,900.

Maine.

PORTLAND, ME.—The Portland & Cape Elizabeth Electric Railway Company has been granted a franchise.

NORWAY, ME.—It is said that two miles of the Norway & South Paris Street Railway Company will be built this season. J. F. Hill, Augusta, is secretary.

PORTLAND, ME.—The Stedman Automatic Street Railway Switch Company has been incorporated with \$600,000 capital. W. F. Stedman, Quincy, Mass., is president.

PORTLAND, ME.—Thomas S. Krutz and H. R. McLeod, superintendent of the Cape Elizabeth Electric road, have opened an office at 45 Exchange street. The line will be built to Simonton's cove this season.

BELFAST, ME.—The Waldo Electric Street Railway Company has elected Nathan F. Houston, Belfast, president; John H. Quimby, Belfast, clerk and treasurer; directors, John G. Brooks, Belfast; H. L. Shepherd, Rockport; E. K. O'Brien, Thomaston.

SKOWHEGAN, ME.—The Somerset Traction Company will build 12 miles of electric road this season. Bids will be received June 8 for grading 5 miles of road, and the remainder of the contracts will be let a few weeks later. E. E. Greenwood is engineer.

BELFAST, ME.—H. L. Shepherd, Rockport, and William O'Brien, Thomaston, are interested in the Waldo Street Railway Company, which proposes to build an electric line from Stockton Springs to Cam-

den. F. A. Colby and W. C. Perkins, Berlin, N. H.; E. J. Morrison, Belfast, are also interested in a proposed line between Stockton Springs and Camden.

Maryland.

CUMBERLAND, MD.—The Cumberland Railway Company is constructing a horse car line in South Cumberland.

PRINCESS ANNE, MD.—Thomas H. Bock is organizing a company to build an electric line from Princess Anne, to Deal's Island.

HAGERSTOWN, MD.—Powell Evans, representing Philadelphia capital, has applied for a franchise to string wires to supply electricity for commercial use, obtaining power from the Potomac river.

WESTMINSTER, MD.—Alexander D. Anderson, Washington, D. C., has taken hold of the proposed Westminster & Union Mills Electric Railroad Company, and is working on a plan to secure the speedy construction of the road.

ROCKVILLE, MD.—The Tacoma, Burnt Mills & Sandy Springs Railway Company, of Montgomery county, has been incorporated to build an interurban. Capital, \$100,000; incorporators, J. B. Colegrove, M. F. Sliney, Allen Freas, F. Ray Keys and B. H. Colegrove.

Massachusetts.

WESTFIELD, MASS.—The Highland Street Railway Company has voted to sell out to the Woronoco Street Railway Company.

BRAINTREE, MASS.—The Braintree & Randolph Street Railway Company has been granted a franchise for an electric road from Randolph to South Braintree.

WORCESTER, MASS.—The Consolidated Street Railway Company may lease the Worcester & Shrewsbury Street Railway Company and the Worcester & Shrewsbury Railroad Company.

BROCKTON, MASS.—The Brockton & North Eastern Street Railway Company has been incorporated with \$50,000 capital by John P. Morse, Judge Warren A. Reed; Horace B. Rogers, Brockton; G. H. Campbell, Lawrence; Edwin S. Webster, Alfred A. Glasier, Boston.

VICKSBURG, MISS.—The Vicksburg Electric Street Railway Company's franchise and other property, consisting of a mile of track never used and 250 acres of land, has been sold to satisfy a mortgage, and was bought in for \$17,000 by C. F. Tag & Son and J. H. Benedict, of New York.

BRAINTREE, MASS.—The Braintree Street Railway Company has been re-organized with the following: Joel F. Shephard, president; Geo. A. Beatty, treasurer; directors, M. Branley, Braintree; John Beatty, Hyde Park; W. O. Chapman, Charles H. French, Canton; George D. Moore, Worcester.

MILFORD, MASS.—The Natick, Framingham, Ashland & Hopkinton Street Railway Company have contracted with C. W. Shipper and R. B. Green to build its road from Hopkinton to this city. An extension will be constructed from Hopkinton to Lincoln Square, over the Milford and Hopedale road.

WORCESTER, MASS.—The Warren, Brookfield & Spencer Street Railway Company has secured its franchises, and must begin work in thirty days. I. L. Currier, Worcester, is the active man. The Worcester Construction Company has agreed to take \$15,000 in stock, and is reported to be willing to take the contract for constructing the road for \$200,000.

TAUNTON, MASS.—Forty per cent of the capital stock of the Dighton-Somerset & Swansea Street Railway Company has been called to provide for construction. The officers are Col. B. D. Duval, Fall River, president; Orville A. Barker, Taunton, clerk; S. M. Thomas, Taunton, treasurer; directors, the officers and F. W. Brightman, Fall River; Cornelius A. Davis and Henry B. Leonard, Somerset; N. Allen Walker, Dighton; J. N. Beckley and George Wellman, Rochester, N.Y., Henry H. Crapo, New Bedford.

Michigan.

FLINT, MICH.—John E. Nolan has a street railway franchise pending in the council.

TRAVERSE CITY, MICH.—The Old Mission Resort Association is making arrangements to construct an electric line.

JACKSON, MICH.—Smith Bros., who own the street railway company, are in the market for a dynamo for 400 to 500 lights for their carriage factory.

JACKSON, MICH.—The Township of Summit has granted a 30-year franchise to the Jackson Street Railway Company, which will extend its line to Vandercook Lake.

DEARBORN, MICH.—Thomas D. Kearney, representing eastern capitalists, has been granted a franchise for an electric line to the western limits of the village from Ann Arbor.

GRAND HAVEN, MICH.—The new street railway company, which is nameless so far as we have been able to learn, has elected George W. Jenner, president; G. B. Parks, secretary; S. L. Monroe, treasurer; S. H. Boyce and A. J. Emlaw, directors.

Minnesota.

DULUTH, MINN.—It is reported that the Bay View Heights Incline Railway Company is to be extended to Proctorknott.

Missouri.

ST. LOUIS, MO.—The Union Depot Railroad Company has accepted its franchise for an extension.

SPRINGFIELD, MO.—Charles M. Parker, receiver of the Metropolitan Electric Railway Company, will extend the line $\frac{3}{4}$ of a mile.

DE SOTO, MO.—The Jefferson County Court has granted a franchise to St. Louis parties to build an electric railway from St. Louis to Morse's Mills.

ST. JOSEPH, MO.—W. A. Kelland, vice-president, has been appointed receiver of the St. Joseph Light & Traction Company, on which a mortgage is about to be foreclosed.

ST. LOUIS, MO.—The Jefferson Avenue Railway Company has filed its bond and acceptance of all the conditions of the ordinance giving it the right to change its motive power to electricity.

ST. JOSEPH, MO.—The property of the St. Joseph Traction & Light Company has been ordered sold to satisfy the first mortgage of \$1,000,000 held by the Central Trust Company, New York.

KANSAS CITY, MO.—S. P. Twiss, Judge Guinotte, Judge Edward H. Stiles, 514 Massachusetts building, and others are interested in a proposed electric line from the terminus of the Fifteenth street cable line to Evanston.

NEVADA, MO.—H. C. Moore is now in control of the Nevada City Street Railroad, which has $4\frac{1}{2}$ miles of track, 8 cars and 14 horses. He writes that to anyone who will put in an electric road, he will give a "good thing."

ST. LOUIS, MO.—J. B. Clayton and others have been granted a franchise by the county court to build an electric railway from Carondelet to Fenton. The line is to be an extension of the Southern Electric Railway and will carry freight as well as passengers.

ST. LOUIS, MO.—The Howard Construction Company has been incorporated with \$10,000 capital, by Thomas Howard, John A. Holmes, J. C. Richardson, Estill McHenry, John J. Broderick, N. C. Chapman, Charles B. Greeley, L. R. Blackmer, Thomas M. Gallagher, J. B. Case, M. C. Orton, J. H. A. Meyer, J. B. Dawson. The company will construct the proposed electric road in the western part of the city, through Kirkwood to Meramec Highlands, known as the Howard line, and the Manchester Avenue Electric Railway Company.

KANSAS CITY, MO.—The Metropolitan Street Railway Company has absorbed the Kansas City Cable Railway Company, Grand Avenue Railway Company, Kansas City & Independence Rapid Transit Company and West Side Electric and Kansas City Traction Company, Kansas City, Kan. The capital is \$8,500,000 and there are \$8,500,000 bonds. The consolidation is on the basis of the net earnings of the several roads for four months. The new Metropolitan Street Railway Company has $128\frac{1}{2}$ miles of single track, being $118\frac{1}{2}$ miles in Missouri and 10 miles in Kansas. The directors will probably be C. F. Morse, S. B. Armour, E. J. Martyn, George H. Nettleton, Wallace Pratt, W. H. Holmes, C. F. Holmes, D. B. Holmes, and Robert Fleming or Hugh C. Ward. The Armour interests are about \$700,000.

Mississippi.

MERIDIAN, MISS.—S. H. Gehlman, Springfield, Ill., and L. H. Bradley, Peoria, have secured an electric railway franchise.

Nebraska.

NEBRASKA CITY, NEB.—It is reported that the Nebraska City Street Railway Company will extend its lines.

BEATRICE, NEB.—At 1 o'clock, July 3, M. C. Steele, receiver, will sell the Beatrice Rapid Transit & Power Company, which has been appraised at \$37,000.

GRAND ISLAND, NEB.—A new street railway company has been incorporated by H. T. Jul Fuehrman, H. C. Joehneck, Hans Joehneck, W. S. Saiter and Joseph Sonderman. They have purchased the present franchise and will apply for extensions. Horse power will be used for the present, but electricity is contemplated.

New Hampshire.

DOVER, N. H.—The Union Street Railroad Company will be sold July 6, by George E. Macomber, receiver.

WELLS, N. H.—C. W. Tibbets, Dover; W. H. Eaton, O. J. Hubbard, J. H. Mildram, C. O. Chamberlin, W. S. Wells, of Wells; J. H. Littlefield, H. D. Littlefield, Josiah Chase, Ogunquit; F. M. Boice, Manchester; O. J. Bagley, Somersworth; Capt. J. D. Midden, Melrose, Mass., are directors of the Wells & Ogunquit Electric Railway Company. Construction will begin this season.

New Jersey.

HOBOKEN, N. J.—The Sea Beach Construction Company has been incorporated to equip and construct street railways.

ATLANTIC CITY, N. J.—William J. Thompson, Gloucester City, and James Scott, Chester, Pa., are interested in a proposed electric railway to Camden.

PASSAIC, N. J.—The Passaic & Newark Electric Traction Company has been incorporated with \$250,000 capital by Albert S. Jones, New York; Charles A. Stelling, James W. Clinton, Passaic.

NEW BRUNSWICK, N. J.—The New Brunswick City Railway has been purchased by Gottfried Krueger and Edward, John and Andrew Radel, of Newark, for \$52,500. The new management will change the equipment from horse to electricity over the present 7 miles of single track. A single track trolley line will be built from New Brunswick to South Amboy, a distance of 14 miles.

New York.

COHOES, N. Y.—The Cohoes City Railway Company will build an iron bridge.

TROY, N. Y.—The Troy City Railway Company may extend its line to Averill Park.

SAYVILLE, N. Y.—J. S. Hawkins, Stony Brook, is making surveys for an electric railway.

ROME, N. Y.—The Rome City Street Railway Company will use compressed air motors.

CORTLAND, N. Y.—The Cortland & Homer Electric Street Railway Company will extend its lines.

BUFFALO, N. Y.—It is reported that the Buffalo Railway Company will build a new car barn to accommodate 50 cars.

CLINTON, N. Y.—A. Gardiner Benedict and Fred B. King, can give information concerning a proposed electric road to New Hartford.

BUFFALO, N. Y.—The Buffalo & Tonawanda Electric Railway Company has received authority to increase its capital stock to \$250,000.

NEW YORK, N. Y.—The New York Compressed Air Motor Company has been incorporated with \$4,000 capital, by A. L. Washburn, J. L. Schofield, J. N. B. Bond.

NEW YORK.—The Kings, Queens & Suffolk Company, 106 Fulton street, announces that the treasurer has sufficient money to go ahead with the construction of its lines in Long Island.

BROOKLYN, N. Y.—Benjamin Norton has resigned the presidency of the Atlantic Avenue Railroad Company. He will be succeeded by H. M. Littell, of the New Orleans Traction Company.

TROY, N. Y.—James K. Averell will receive bids for constructing an electric line. Work will be begun at the city limits of Albion and connect with the Troy City Railway Company, giving a service to many neighboring towns.

WAKEFIELD, N. Y.—The Edenwald Street Railway Company has been incorporated with \$50,000 capital, by Jefferson M. Levy, G. Waite Tubbs, New York; John M. Digney, White Plains; George J. Penfield, Wakefield, and others.

FLUSHING, N. Y.—The Steinway Railroad Company has taken possession of the Flushing & College Point Street Railway Company. The Steinway Company will enter Flushing by June 1 with a through line from Long Island City.

NEW YORK, N. Y.—The Esmond International Electric Traction Company has been incorporated with \$1,000,000 capital to build electric roads, by Charles C. Dodge, New York; Frederick C. Esmond, Brooklyn; Henry Seligman, Hastings, N. Y.

PATCHOGUE, N. Y.—The Patchogue & Port Jefferson Traction Company will build an electric railway from Port Jefferson through Selden and Medford to Patchogue. Orange T. Fanning, Port Jefferson; Joseph B. Swezey, Wilson Ritch, Patchogue, are interested.

BROOKLYN, N. Y.—The Long Island Loan & Trust Company is foreclosing its \$100,000 mortgage on the Long Island City & Newtown Railroad, which is in charge of Receiver Lucien N. Manley, who was appointed on the suit of the Rochester Car Works, a creditor.

NEW YORK, N. Y.—Ernest Hall is temporary receiver for J. C. Thompson & Co., 66 Broadway, at the instance of Royal C. Vilas, who has sued his partners, John C. Thompson and Charles A. Starbuck. He wants the firm dissolved, which was formed to build the Port Richmond & Prohibition Park Electric Railway, which is completed.

ALBANY, N. Y.—The Syracuse & Oneida Lake Electric Railway Company has been incorporated with \$300,000 capital to operate 12 miles of electric road from Cicero to Salina, Onondaga county, by Hiram McGonigal, New York; W. S. Wales, W. B. Kirk, J. B. Morgan, William O'Connor, Thomas Meacham, Edwin Ledder, James N. McCormick, W. E. Wheaton, Syracuse.

WATKINS, N. Y.—The Watkins & Havana Railroad Company has been incorporated to build an electric street railway to Havana Glen, a distance of 5 miles. Capital, \$50,000; directors, C. H. Baldwin and O. M.

Wixon, of Elmira; C. L. Hathaway, R. M. Bundy and H. J. Weller, of Horseheads; John E. Mulford and Charles D. Clawson, of Montour Falls; Oliver P. Hurd and Charles S. Frost, of Watkins.

NIAGARA FALLS, N. Y.—The Buffalo & Niagara Falls Electric Railway Company and the Buffalo & Tonawanda Electric Railway Company have been consolidated as the Buffalo & Niagara Falls Electric Railway Company, with \$1,250,000 capital. The directors are W. Caryl Ely, Charles B. Gaskill, Burt Van Horn, Jr., Frank A. Dudley, Niagara Falls; Robert L. Fryer, Henry J. Pierce, George P. Dunbar, John J. McWilliams, Buffalo; Willard P. Whitlock, Elizabeth, N. J.

Ohio.

SPRINGFIELD, O.—The Springfield Street Railway Company will extend its line.

SPRINGFIELD, O.—James Johnson, Jr., has applied for an electric street railroad franchise.

SHELBY, O.—The Shelby Electric Railway Company has been incorporated with \$10,000 capital.

GALLIOPOLIS, O.—The Galliopolis Street Railroad will be sold Wednesday by order of court.

CANFIELD, O.—The township has voted to give a bonus of \$20,000 for an electric railway to Youngstown.

ELYRIA, O.—Tom L. Johnson says an electric road will be built from his plant at Lorain to Cleveland, 25 miles.

NORWALK, O.—The county commissioners have granted permission to S. E. Crawford to operate a steam motor road.

MIDDLETOWN, O.—F. R. Douglass, a contractor, bought the Middletown & Madison Street Railway Company for \$9,350.

COLUMBUS, O.—Fowler & Loomis are making a survey for the Columbus & Buckeye Lake Street Railway Company, which is to be 26 miles long.

DEFIANCE, O.—The power-house of the Defiance Light & Power Company was partially destroyed by fire. Loss, \$7,000. The machinery was damaged.

TIFFIN, O.—N. W. Miller has been appointed receiver of the Tiffin Electric Street Railway Company and the Interurban Consolidated in place of M. Frost, resigned.

CLEVELAND, O.—The Cleveland & Painesville Railway Company has been incorporated with \$200,000 capital by John J. Shipherd, M. H. Solloway, Nelson Moses, J. S. Casement and C. O. Child.

CINCINNATI, O.—The Oakley & Cincinnati Street Railway Company has been incorporated with \$10,000 capital, by R. J. H. Archibald, John Rempe, H. P. Sabbert, Edwin E. Schneider, A. G. Kroetsch.

SHELBY, O.—S. S. Bloom, Albert Moore, G. D. Gilleben, C. S. Holbrook, F. A. Abbott, J. W. Williams are interested in the Shelby Electric Railway Company, which proposes to construct a line from Annapolis to Olivesburg.

CLEVELAND, O.—Surveyors Albert W. Buell and Frank Ford, have reported the estimated cost of the road to Chagrin Falls, 13½ miles, to be \$135,000. Albert Mitchell, Newburg, and C. B. Thompson, Cleveland, are interested.

TOLEDO, O.—The Toledo Traction Company has succeeded the Toledo Consolidated Street Railway Company, with \$4,000,000 capital, and \$4,000,000 of bonds. A. E. Lang is president and Charles L. Wight, secretary. Plans for a new power house of 5,000-horse-power capacity are being prepared. No contracts have been let.

TIFFIN, O.—The Interurban Rapid Transit Company has been incorporated with \$250,000 capital, by Meshech Frost, Amandus Betts, Lewis Selle, W. P. Noble, Tiffin; Norman McCarthy, Toledo; O. C. Evans, Cincinnati. The old company will be bought and an extension constructed to Fostoria. A powerhouse will be built at Bascom.

Oregon.

PORTLAND, ORE.—The City Park Railway Company has been incorporated with \$25,000 capital by S. Z. Mitchell, C. N. Higgins and J. A. Cranston. It will operate and extend the old Port Defiance Railway in Tacoma.

Pennsylvania.

LITITZ, PA.—An electric railway franchise has been granted.

PITTSBURG, PA.—The four traction lines have been consolidated by the Elkins-Widener syndicate.

TAMAQUA, PA.—The court has ordered the sale of the Inter-County Electric Railway Company on June 16, by the receiver.

PITTSBURG, PA.—Hayes & Noble, 115 Diamond street, represent a company that proposes to build several miles of electric road

SHAMOKIN, PA.—The Shamokin & Mt. Carmel Electric Railway Company will build a trolley line between Ashland and Centralia.

DARBY, PA.—The Collingdale Street Railway Company has been incorporated to run from Darby to Collingdale. Capital, \$550,000.

UNIONTOWN, PA.—The Uniontown Street Railway Company was sold May 31 to satisfy a levy on an old execution for \$4,000 in favor of the Edison Company.

ALLENTOWN, PA.—At a meeting of the directors of the Allentown-Kutztown Electric Railway Company it was decided to begin construction. Bids will soon be wanted at the Philadelphia office.

PITTSBURG, PA.—The Pittsburg, Neville Island & Caraopolis Electric Railway Company has been bought by the Pittsburg & West End Passenger Railway Company and the Second Avenue Traction Company.

PHILADELPHIA, PA.—The Hestonville, Mantua & Fairmount Passenger Railway Company has leased the Fairmount Park & Haddington Passenger Railway Company at an annual rental of 6 per cent on the capital of \$300,000.

PITTSBURG, PA.—A visit of P. A. B. Widener and W. L. Elkins to inspect the construction of the amusement pavilion of the Pittsburg & Duquesne Traction Company caused a rumor that the Widener-Elkins syndicate would consolidate the eleven Pittsburg companies with a \$20,000,000 capital.

PHILADELPHIA, PA.—The newly chartered Philadelphia & West Chester Traction Company is about to increase its capital to \$400,000, to build a line to West Chester and absorb the Delaware County & Philadelphia Electric Railway Company and the Castle Rock & West Chester Passenger Railway Company.

PITTSBURG, PA.—At the office of W. T. Treadway, 110 Diamond street, the Coraopolis, Sewickley & Economy Street Railway Company was organized with \$150,000 capital. The officers are C. I. McDonald, Pittsburg, president; Simon Harrold, Beaver Falls, vice president; George A. Lashell, secretary; W. T. Treadway, solicitor; J. C. Whitla, John S. Duss, J. A. Ferguson, J. W. Arras, directors. The line will pass through Hays Station, Osborne, Sewickley, Quaker Valley, Edgeworth, Shields, Leetsdale, Fair Oaks, Economy, Homewood, New Galilee, Enon, East Palestine, Industry, Cook's Ferry, Smith's Ferry, East Liverpool and Wellsville.

South Carolina.

CHARLESTON, S. C.—John B. Hoefgen and Edgar Moxliam, representing a Brooklyn Syndicate, have bought the Charleston City Railway Company and the Enterprise Railroad Company. The lines will be consolidated and equipped for electric traction. Mr. Hoefgen will be permanently located here.

Tennessee.

KNOXVILLE, TENN.—The sale of the Knoxville Electric Street Railway Company has been postponed until July 20, at the request of bondholders.

Texas.

DALLAS, TEXAS.—The Dallas City Railway Company has been incorporated with \$500,000 capital by Frank P. Clark, Goodwin L. Blackford, J. L. Sale.

DALLAS, TEX.—The Dallas Consolidated Traction Company has been purchased from the receiver by F. P. Clark, attorney for first mortgage bondholders.

WACO, TEX.—The Waco Electric Railway & Light Company has been bought by Henry C. Scott, president of the Citizen's Street Railway Company, and the two interests will be consolidated.

SAN ANTONIO, TEX.—Edward Packard, representing bondholders, has purchased the San Antonio Rapid Transit Street Railroad Company. E. W. Randall will remain in charge as superintendent, and the line will be extended.

SAN ANTONIO, TEXAS.—The Alamo Heights Railway Company with \$62,000 capital, succeeds the San Antonio Rapid Transit Company. The officers are C. L. Harwood, president; B. W. Randall, secretary and manager; S. K. Buchanan, treasurer.

Virginia.

RICHMOND, VA.—The Manchester Railway & Improvement Company has been granted a franchise for an electric road and will connect with the Richmond City Railway Company, which will be extended. Construction will soon begin.

Washington.

ABERDEEN, WASH.—S. F. Coons, an attorney of Spokane, and George Nelson, of Aberdeen, have applied for a franchise and bonus for an electric railway between Aberdeen and Hoquiam.

TACOMA, WASH.—In attempting to foreclose the \$1,350,000 mortgage on the Tacoma Railway & Motor Company, the New York Guaranty & Indemnity Company has, it is said, encountered the Armours, who have set out to compel a compromise.

Wisconsin.

BARABOO, WIS.—F. A. Philbrick has applied for an electric railway franchise.

LACROSSE, WIS.—The LaCrosse City Railway Company will probably extend its line $2\frac{1}{4}$ miles.

BARABOO, WIS.—The Baraboo City Railway Company has petitioned for an electric railway franchise.

GREEN BAY, WIS.—The McCartney Electric Street Railway Company will build several miles of road.

KAUKAUNA, WIS.—The Council has ordered the street railway franchise of Thompson & Rutan published.

MILWAUKEE, WIS.—The Milwaukee Street Railway Company will extend its National avenue line to the State Fair grounds, having received a bonus.

NEENAH, WIS.—The Menasha & Neenah Street Railway Company has been sold to F. C. Rutan, who is interested in a proposed inter-urban road to Appleton and Kaukauna.

MENASHA, WIS.—The Central Wisconsin Electric Railroad Company, Elmer & Vanderzee, Green Bay; and Ferdinand Schumacher have applied for electric railway franchises.

EAU CLAIRE, WIS.—The Eau Claire Street Railway, Light & Power Company has passed into the hands of George R. Wheeler, receiver, on a suit brought by the Atlantic Trust Company, of New York, which holds \$400,000 bonds.

MILWAUKEE, WIS.—The Milwaukee & Waukesha Electric Railway Company has been formally organized, with \$1,000,000 capital, and the following directors, J. W. Bingham, A. B. Myers, Jacob Wellauer, Charles Pittelkow, James Petley, Max Rosenthal, Stutley I. Henderson, Milwaukee; J. J. Constantine, Andrew Snyder, Waukesha. Construction will soon begin.

LACROSSE, WIS.—The LaCrosse, Black River Falls & Neillsville Electric Railway Company has organized with Nathan Clark, president; W. H. Polleys, vice-president; Paul McHugh, secretary; T. J. McHugh, treasurer; William Beirne, treasurer; T. J. McHugh and W. H. Polleys, superintendents of right of way. Surveyors are in the field. The company has offices at room 20 Batavian Bank building.

MILWAUKEE, WIS.—The Milwaukee Street Railway Company is in the hands of Henry C. Payne and George R. Sheldon, New York, receivers, on petition of the Central Trust Company, New York, North American Company and the Milwaukee Street Railway Company, New Jersey. It is believed the receivership will be of short duration, as a plan of reorganization has practically been agreed upon by the holders of most of the \$12,000,000 of bonds. The receivership was the result of the inability of the company to pay \$247,652 interest due June 1, as there is only \$90,000 in the treasury. The Badger Illuminating Company and Edison Company with 46,486 lamps, and the 122 miles of street railroad of the Milwaukee Street Railway Company are covered by the receivership. Interest due December, 1893, June, 1894, December, 1894, has not been paid.

MILWAUKEE, WIS.—Frederick Olcott, Arnold Marcus, William N. Cromwell, C. W. Wetmore, were appointed at a meeting in New York, to reorganize the Milwaukee Street Railway Company. A new company is to be organized with \$7,000,000 first consolidated 5 per cent first mortgage bonds and \$7,000,000 capital stock of which \$3,500,000 shall be 5 per cent preferred, and \$3,500,000 common stock. The new company will be authorized to increase its preferred capital stock and its first mortgage bonds \$1,000,000, to be used for extension of the plant. Of the \$7,000,000 bonds \$1,500,000 are to remain in the hands of a trustee against a like amount of existing underlying first mortgage bonds, and \$5,500,000 is to be divided pro rata among the holders of the now outstanding first mortgage bonds on a basis of 61.756 per cent. Of the \$3,500,000 common stock, \$2,550,000 will be given in exchange for \$1,275,000 second mortgage bonds of the old company. The remaining \$950,000 common stock will be divided pro rata among stockholders of the old company, who will receive 202.10 per cent of their present holdings in new stock.

BOSTON. HALF FARE EXCURSION VIA THE WABASH.

For the International Christian Endeavor Convention, which is to be held at Boston, in July, the Wabash railroad offers a rate of one first-class limited fare for the round trip. Tickets will be on sale at the Wabash ticket office, 97 Adams street, Chicago, July 5, 6, 7, 8 and 9. The Wabash has been selected as the official route from Chicago, by the Christian Endeavor organizations of Iowa, Nebraska, Colorado, Illinois and Chicago. Secure your tickets via this route and go by the way of Niagara Falls. For map of Boston, time tables, full information as to routes, etc., send a postal card to F. A. PALMER, A. G. P. A., 97 Adams street, Chicago.

EPWORTH LEAGUE SPECIAL.

The Chicago districts have arranged with the Monon Route for a special vestibuled train of handsome Pullman sleepers and day coaches to run through solid to Chattanooga, leaving Chicago at 7:30 P. M., June 26. The route is via Cincinnati, through the famous Blue Grass Regions of Kentucky, and over the picturesque and historic Cumberland mountains. The idea is to make this train an "Epworth League Convention, on Wheels." A cordial invitation is extended to all Epworth Leaguers to join us. By the acquaintance thus gained, our stay in Chattanooga will be made much more pleasant. The rate will be \$17.30 for the round trip; tickets good for thirty days. For full information, address C. T. Northrop, president, Chicago District, 14 and 16 Pacific avenue, Chicago.

Because his fish died for lack of fresh water while he was in jail on the charge of assaulting a conductor of the Denver, Colo., City Cable Railway Company, Albert H. Flood, a fishmonger, has brought suit for \$5,000 damages. Next time Mr. Flood goes out to abuse conductors he had better provide his fish with a "flood" at home.

LEEDS MUNICIPAL RAILWAY WILL ADOPT ELECTRICITY.

Leeds has operated its street railway a year, and now announces a surplus of about \$600. Inasmuch as there are no stockholders clamoring for dividends the officers in charge may consider themselves fortunate to come out even. A new broom, however, may be counted on to sweep fairly clean, and while there may have been no juggling with figures to achieve the \$600 surplus, the temptation is easily recognized that annually confronts officers whose tenure of office must depend on at least a fair showing. What the balance will be later on when the present new equipment requires repairs, remains to be seen. A sensible decision has been reached to displace horses and steam dummies with the trolley.

London, a financial journal, says:—"Leeds, which owns the whole 41 miles of tramways in the town, is now proposing to adopt electric traction. The report of the Tramways Committee of the Corporation, which sets forth their investigation into tramway traction and their recommendations in the matter, has now been prepared. It points out that the existing system aggregates 27 miles of track, and when the proposed extensions are carried out the total will be over 41 miles. The total capital expenditure on the lines already in existence is £143,617. The committee have come to the conclusion that the present dual system of haulage—viz., by steam and horse power—should be superseded; that oil, gas and compressed air are at present impracticable; and that having regard to the many different routes in Leeds and the total length, the varying requirements of each route as to frequency of service, and the fact that the steep gradients are here uncommon, they are unanimously of opinion, and recommend to the Highways Committee, that electric traction is the most suitable for the tramways of the city, and, on the whole, the committee's preference is for electric traction with overhead wires, except in the center of the city, where a conduit system should be adopted.

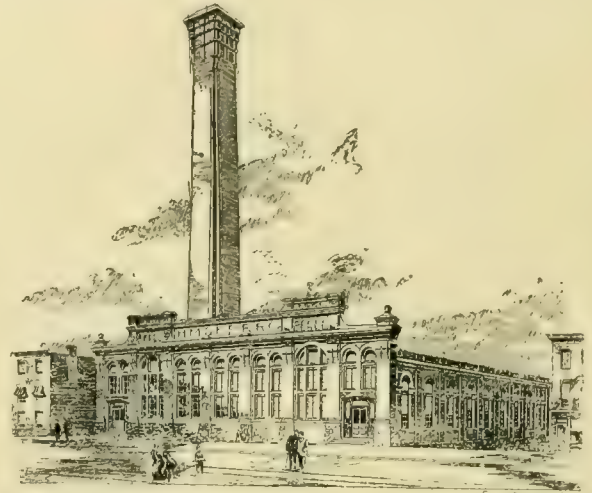
A balance sheet, showing the result of the working of the tramways has been prepared by the city accountant. The undertaking was handed over to the Corporation by the old company on February 2nd, 1894. During the year ended March 25th last, the total income was £51,013 10s. 7d., and the expenditure £44,123 8s. 11d., leaving a gross profit of £6,890 1s. 8d. From that has to be deducted the interest and sinking fund charges, which amounted to £6,756 14s. 3d., so that there is an actual surplus on the year's working of £133 7s. 5d. Since the tramways came under the control of the city, the committee have had to meet heavy exceptional expenditure out of revenue. Then, again, the committee have reduced the number of hours worked by the employees, and have increased their wages. During the period covered by the accounts the Corporation have carried over 1¼ million more passengers than the late company ever did in a similar time, while the mileage run has been increased by over 160,000."

GREENE ENGINES, PHILADELPHIA.

There has recently been completed the Fairmount Park and Haddington Passenger Railway Company at Philadelphia. This road is seven miles long and connects with and is operated by the Hestonville, Mantua & Fairmount Passenger Railway being supplied with motive power from the power house of the latter company. Four improved Greene engines built by the Providence Steam Engine Company, Providence, R. I., have been installed by the Hestonville, Mantua & Fairmount Passenger Railway Company. They are of the tandem compound condensing type, each engine having a high pressure cylinder $17\frac{1}{2}$ inches in diameter and 4 feet stroke, and a low-pressure cylinder 33 in. in diameter and 4 feet stroke. The engines operate under an initial pressure of 125 pounds by gage and 100 revolutions per minute and are direct connected to 500 K. W. General Electric generators. Although each engine was only required to develop 500-horse-power with its best economy, each of them has nearly doubled this requirement, having operated individually a load of 900-horse-power. The regulation is sensitive and there is an elasticity in cut-off up to and including 3-4 of the stroke.

These engines are not built of the same proportions as mill engines, but are of special design for the trying con-

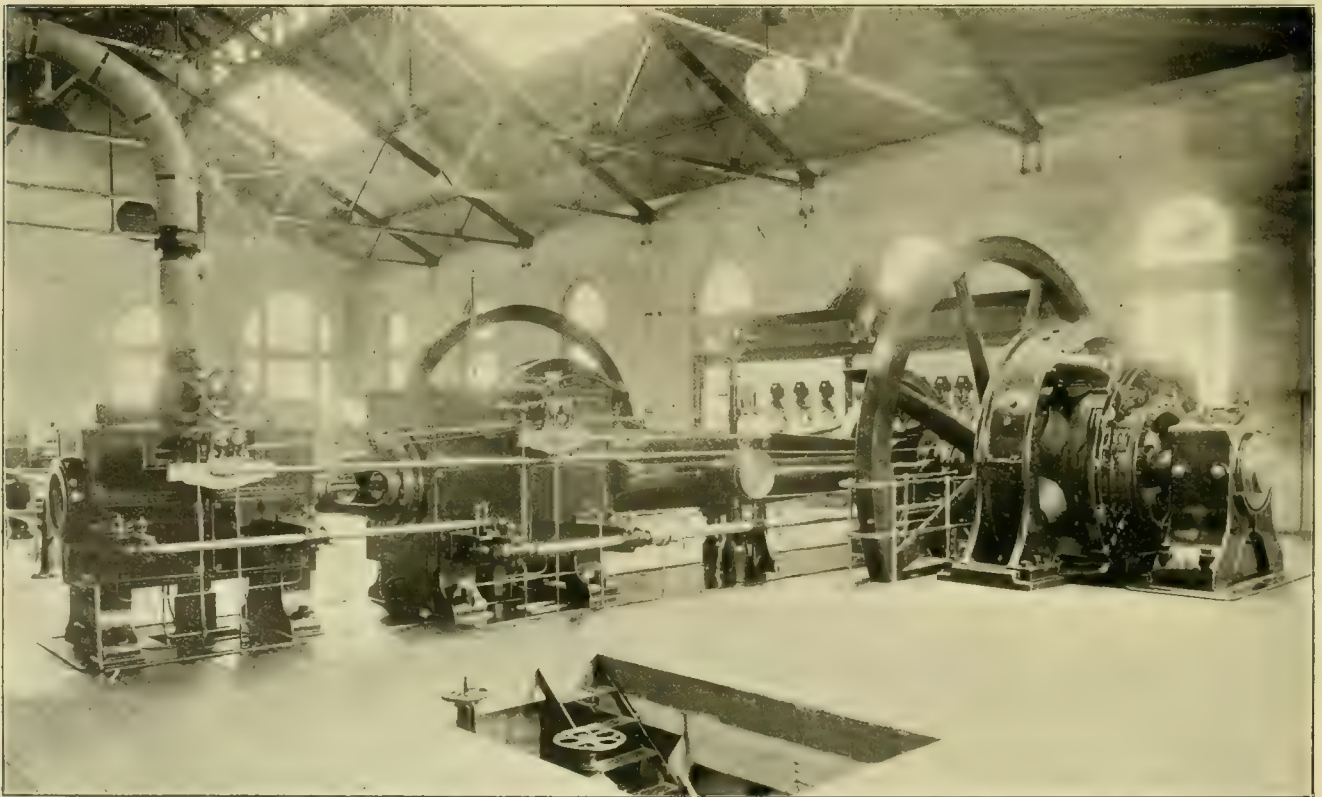
condensing apparatus. The feed water is pumped through the compound heater to a supplementary heater which



POWER HOUSE HESTONVILLE, MANTUA & FAIRMOUNT COMPANY.

receives all the exhaust steam from the condenser pumps and other steam pumps in the station.

The manufacturer says, "While these engines have not been working under conditions of load favorable to best economy, as they run 24 hours steadily, and, of



GREENE ENGINES—HESTONVILLE, MANTUA & FAIRMOUNT PASSENGER RAILWAY COMPANY.

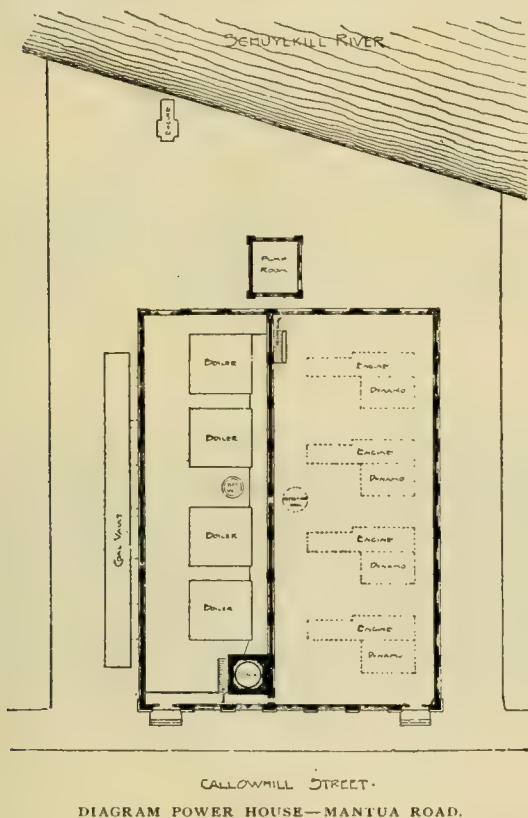
dition of railway work. Each engine has a receiver, compound heater and independent condensing apparatus. The exhaust steam is taken from the low pressure cylinder through the compound heater and from thence to the

course, with a very light load during a portion of the night, they show an economy that is phenomenal."

The total amount of coal used in the plant when charged to the engines shows a consumption of 2 1-10

pounds of coal per horse-power per hour, buckwheat coal being used. These engines were put upon their load without preliminary trials, immediately upon the completion of the erection and the roads have never been stopped for one moment from any cause due to the lack of motive power.

A. Langstaff Johnston, the consulting engineer, who had charge of the construction of these roads, has a world wide reputation for original scientific work of marked merit which has been reflected in all subsequent electric railway construction. Mr. Johnston made his appearance in the street railway field in 1887 as the chief engineer of the Richmond Union Passenger Railway, one of the first commercially successful electric roads constructed.



On this road many difficult problems had to be solved which were worked out from the very beginning, and demonstrated the application of electricity as a motive power for street railways.

Mr. Johnston was born at Richmond, Va., and graduated from the Virginia Military Institute. He studied under some of the most distinguished men in their day in electrical science, among them Capt. J. M. Brooke and Matthew F. Maury. On leaving college Mr. Johnston was engaged with the contractors on some important tunnel work for the Chesapeake & Ohio Railroad. He was afterward appointed assistant city engineer of Richmond, and assisted in the construction of the water works system. Later he was identified with a number of electrical and steam railroad enterprises in Virginia. Mr. Johnston feels particularly proud of the fact that it was he who formulated the plans for the difficult track work for the first electric road in his native city.

In addition to these brilliant achievements, Mr. Johnston has distinguished himself by inventing a number of electrical appliances, among them, the Johnston rail bond, now extensively used; also a device by which a live electric wire is rendered absolutely harmless, whenever broken on the circuit.

Before engaging with the Hestonville, Mantua and Fairmount Railway Company, he constructed the New Orleans & Carrollton Electric Railway in New Orleans, a 20-mile road, the first electric road in the Crescent City. The record of economy of operation this road has made on account of his skill in its construction, has drawn from the directors resolutions of appreciation of his efficient work. Mr. Johnston is also consulting engineer of the Norwalk & Ocean



A. LANGSTAFF JOHNSTON.

View Railroad Company, Norwalk, Va., now under construction. He is a member of the American Institute of Electrical Engineers and a member of the American Society of Civil Engineers and the Franklin Institute.

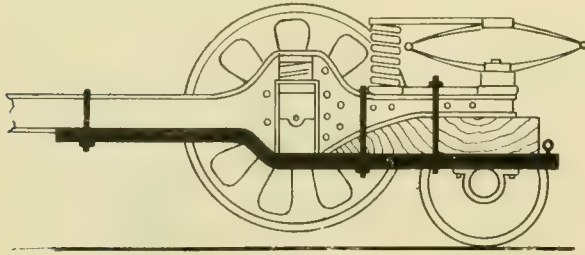
EDUCATING TRAINMEN AT ST. LOUIS.

A very commendable effort to educate employes is being made by W. C. Gotshall, chief engineer of the Union Depot Railroad of St. Louis. A school of instruction has been organized for the conductors and motormen, and Mr. Gotshall gives lectures once a week. An assembly room has been fitted up for this purpose, where are mounted the various motor and controller equipments operated by the company. In this way a practical demonstration of the points made in the lecture can be made and the men learn much more than they would from an abstract talk. There is also an organization of the foremen of the various repair barns of which this company has several. Besides this there is a consulting board composed of the heads of departments. At the meetings of this board questions which come up in the operation of the road are thoroughly discussed and the organization will doubtless be worth many dollars to the company. We believe that these consulting boards and schools of instruction are but the forerunners of many more which will be organized throughout the country as soon as street railways begin to realize how important the education and consultation of employes is. It is a movement along the same line as the bulletin of the Milwaukee Street Railway and is to the great credit of its promoter.

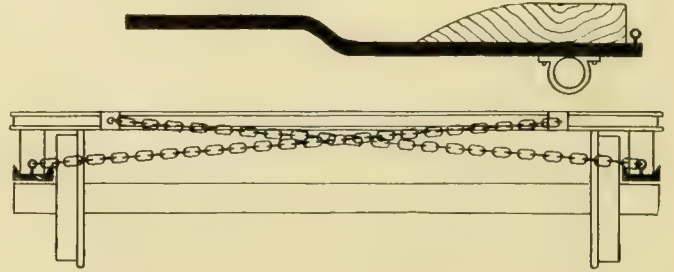
WRECKING CAR AT SOUTH CHICAGO.

One of the most troublesome accidents met with by street railways is the breaking of car wheels or axles, and the way that such broken-down cars are handled is generally rather primitive. Unless the road is a small one the car with the broken axle is jerked off to one side of the track and left until such time as may be con-

a light affair, equipped with a tool box and a device for putting under the end of a truck of a car with a broken axle so that it can be run to the barn for repairs. This device has to be made to suit the truck to which it is to be attached. It is shown here as made for McGuire trucks on the South Chicago City Railway. A pair of 15-inch wheels are mounted on a standard axle. These are run under the end of the truck which has the broken



PLAN OF WRECKING CAR.



venient for the shop men to come out with a new pair of wheels and put them under the car. This is a most delightful operation, as all who have been through the experience will testify. It is so nice to load up a pair of wheels and all the tools lying loose around the shop and go out on a cold day to do on the street what is intended to be done in shop. Nuts and small parts get lost in the dirt and everybody is working at a disadvantage. Finally, after much profanity, the new axle is put under and the car put back on the track. The gang goes back to the barn hoping that it will be a long time before there is another broken axle. The shop foreman charges the wreck with a good big slice of time, and so matters go on year after year. Such is life on the majority of street railways. Occasionally some enterprising street railway man gets tired of this way of doing things, after several repetitions of this performance, and devises something better. B. J. Jones, superintendent, and C. T. Powell, master mechanic of the South Chicago City Railway, have devised and built a wrecking car that is a decided time and labor saver in more respects than one. This car is

axle and are attached to the truck by the appliances shown in the engravings. Before putting it on a truck the wheel guard or fender must be taken off. To make the frame for holding the temporary axle, a piece of channel iron just wide enough to fit under the truck



WRECKING CAR.—SOUTH CHICAGO.



WRECKING TRUCK UNDER CAR.—THE DESIGNER

frame is bent in the manner shown so as to conform to the shape of the truck frame and go under the journal box. A piece of wood is then bolted on to fit under the end of the truck. The journal box of the temporary axle is bolted on after the temporary wheels have been run under. To brace these frames two chains are run across and fastened to the end of the truck frame. These prevent lateral motion. To hold the device onto the truck frame three clips are used. With this temporary axle in place ready to run, the wheels on the broken axle are two inches above the rail. To hold up the motor of the broken axle a hook is put under the axle side of the motor. This hook is suspended from a beam resting on the end sills of the car body inside the car.

All the wrecking apparatus is in such shape that any piece can be handled by two men. It can be put on a wrecking wagon; but on the South Chicago road it is put on a push car. Local conditions will determine whether it is best to use a car or a wagon. On this road

there are long stretches of unpaved streets and the speed of the cars is much greater than that which could be made by a wrecking wagon. If the car cannot get within a block of the accident it can be hauled over the pavement or its contents can be carried by hand to the disabled car. A car can be jacked up and the temporary wheels put under in the time it takes to get a car off the track. Consequently there is a great saving in time of shop men and no increase in the time of a blockade.

IMPERIAL CENTER PIVOT TRUCK.

The improvement in the design and construction of car trucks has been keeping pace with the requirements of the hard service now exacted from street railway roll-

which have been enlarged, the company has not been idle, but has been able to fill its orders in portions of its works that were not burned.

With its new shops and increased facilities the company is in position to handle more street railway business than it was able to accommodate in the old shops. Special efforts are being made to cater to this class of work. At present the company is building 75 cars for street railroad companies. It makes a specialty of turning out work in a short space of time.

KANSAS CITY CONSOLIDATION.

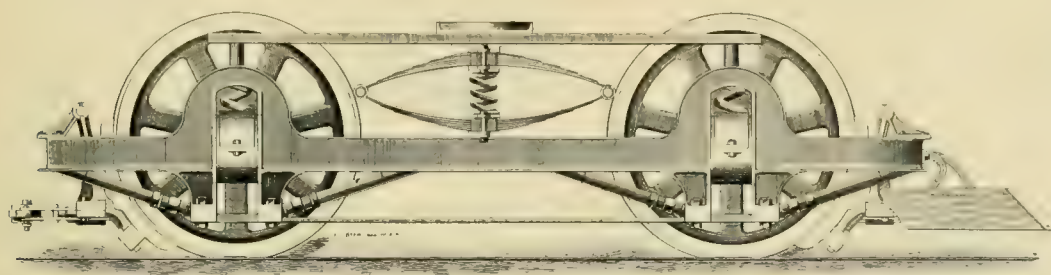
The Metropolitan Street Railway Company is now in peaceable possession of all the street railway companies in Kansas City. The officers are C. F. Morse, president; Walton H. Holmes, vice-president and general manager; directors, George H. Nettleton, Wallace Pratt, D. B. Holmes, C. F. Holmes, S. B. Armour, E. J. Martyn, L. C. Krauthoff. The company will use \$1,-

500,000 in making improvements. The track of the Ninth street line will be relaid. Four new 200-horse-power boilers are to be installed in the Woodland avenue power house. The Kansas City, Kan., elevated railway will be remodeled and new tracks will be laid. The power house at Ninth and Wyoming streets will have additional machinery. The Broadway & Southwest boulevard horse lines will be changed to electric. The operating officers are C. F. Holmes, general superintendent; Thomas Barrett, assistant superintendent; M. Bernardin, assistant manager; W. A. Satterlee, purchasing agent; Robert Gillham, chief engineer.

WISCONSIN RESORTS.

Excursion tickets are now on sale by the Chicago, Milwaukee & St. Paul Railway to Burlington, Elkhorn, Delavan, Milwaukee, Waukesha, Palmyra, Pewaukee, Hartland, Nashotah, Oconomowoc, Kilbourn, Sparta, St. Paul, Minneapolis, Lake Minnetonka, Tomahawk, Minocqua, Elhart Lake, Ontonagon, and all resorts of Wisconsin, Minnesota, the Michigan Peninsula and the Northwest. Special low rates made on Friday, Saturday and Sunday of each week to Wisconsin resorts. For rates, time tables and further information apply at Ticket office, 95 Adams street, or Union Passenger Station, Canal, Adams and Madison Streets.

The M. C. Bullock Manufacturing Company, Chicago, has issued a very neat catalog on the Willans' central valve high speed engine of which it is the American manufacturer. This engine has made a magnificent record in England where it was first manufactured and it is certainly worth the attention of so reputable a firm in America. For a unit of high efficiency a Willans' engine direct coupled to a medium speed dynamo finds few competitors.



IMPERIAL CENTER PIVOT TRUCK FOR LONG CARS.

ing stock. One of the best of the new designs is the Imperial, with center pivot, made by the Fulton Truck & Foundry Company of Mansfield, O., and illustrated in our engraving.

With its main frame in one piece of soft, open hearth steel, and its combined elliptic and coil springs the Imperial presents a rare union of strength and flexibility. The coil springs above the journals are large enough to carry the entire weight of trucks, motors, car body and passengers. A ball bearing king bolt forms the center pivot and is provided with a link movement so that in rounding curves with one rail elevated the car body will not tip. A pin on the subsill prevents side motion and keeps the springs vertical.

WELLS & FRENCH COMPANY.

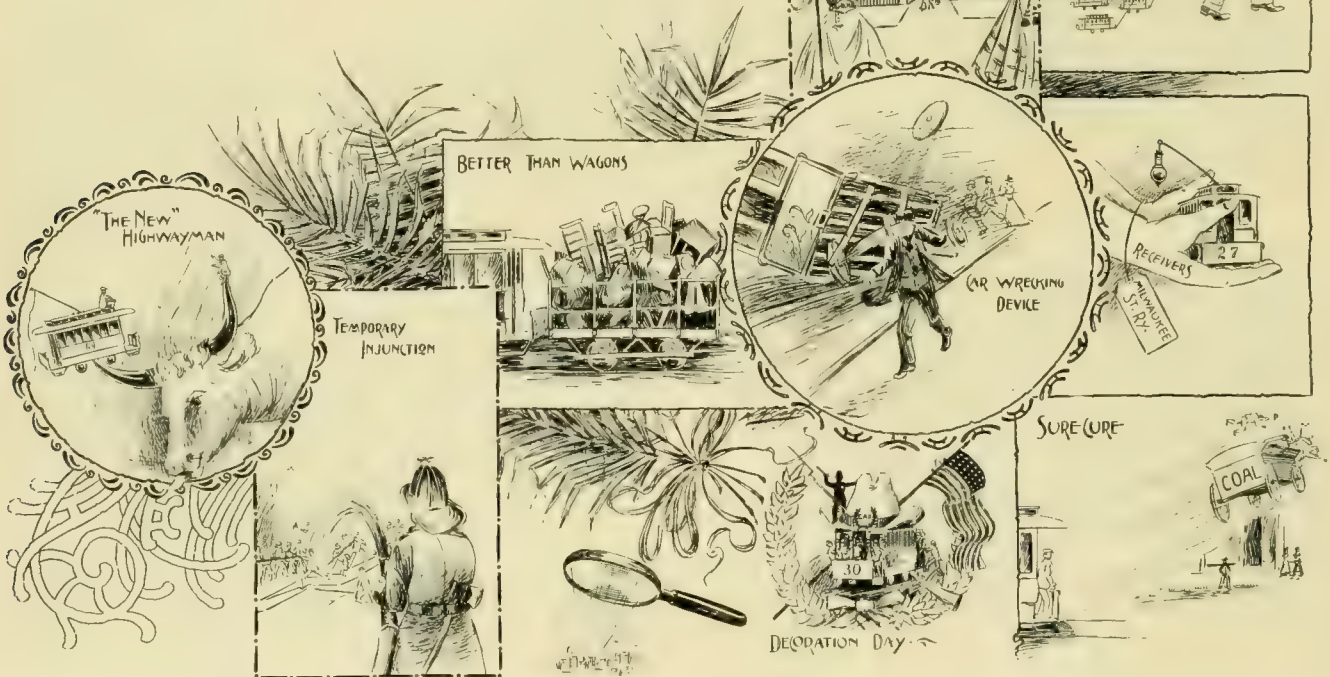
Anyone who happens in the vicinity of Blue Island and Ashland avenues and Twenty-second street, would not believe that there had been two disastrous fires in that locality within a year. Such is the case, however, as the Wells & French Company are well aware. To-day there are new shops, which are fitted up with the best and latest improved machinery for building cars. This is one advantage of a fire, it gets rid of a lot of stuff that is too good to throw away, as it does good work, but its owners would like to have a little better machine in its place, just because it may be of later design.

It is a strong concern that can survive two fires, and that is what the Wells & French Company has done. During the time required in the rebuilding of its shops,

PICTORIAL EVENTS OF A MONTH.

In one of the cities of the west several cars have been held up by highwaymen, who have robbed the conductors of their change. One evening as a car approached the lonely spot where most of the hold ups had occurred, the motorman saw two lights on the track. He rang a signal to the conductor to pull his revolver, as there was danger ahead. The conductor rushed through the car telling the passengers to look out for there were highwaymen in front. The motorman stood by the controller handle with his teeth set, determined to run through the band, but slowed up as the rays from the headlight discovered to him a gentle cow by the roadside. The new highwayman is not to be feared unless he be on the track.

As powerful as an order of court is a stream of water directed by a fire department. One of those annoying details thought out by city officials who must make a



show of earning salaries, but which are of no importance, and are sometimes overlooked by those whom they annoy, was discovered near Niagara Falls. Before it could be adjusted, the city officials ordered out the fire department which turned the hose on the gang of laborers employed by the contractor on one of the new street railway lines. There was no order of court, but work was effectually stopped for a while. Then it was discovered a mistake had been made.

Manhole covers usually knock out such fragile things as human beings and window glass that happen to come in their way, but a street car is generally too big a party for one to tackle. A strong cover with an extra amount of gas behind it, undertook the experiment of banging a New York street car. It was eminently successful, as the car was wrecked.

The Buffalo, Kenmore & Tonawanda Electric Railway Company got ahead of the express men, by soliciting business from people who changed their residences on the annual moving day. The goods were loaded on coal cars.

Summer resorts are doing a big business these days. Attractions are drawing the people to the cars, which draw them to the parks, and everybody is pleased.

Six street railway enterprises in Kansas City have been consolidated as the Metropolitan Street Railway Company. The new company controls a fine property.

Milwaukee is in the hands of receivers, Henry C. Payne and George R. Sheldon, that is her street railway and lighting interests are.

Memorial day was pleasant, for a change, in most of the United States, and all the street railway companies did a big business. More national holidays would be welcomed by the companies, if generally observed by the people.

Gustave Johnson will block no more Brooklyn cars with his coal cart. He didn't get out of the way fast enough to suit a motorman who let his car toss Gustave and his cart through a saloon window. If a few more vehicles were served in the same way there would be less annoyance from this source.



Peckham trucks are used under the new open cars of the Kingston, N. Y., City Electric Railroad.

The St. Louis Car Company, St. Louis, Mo., has built 30 electric cars, and has received orders for 16 additional, for the City Passenger Railway, Baltimore, Md.

The Ball Engine Company, of Erie, Pa., has issued a new list of users of the Ball engine for electric generators. The list is a long one, making 32 pages of fine type.

The Standard Railway Supply Company, of Chicago, is sending out a model of the trolley pole and base furnished by the R. D. Nuttall Company, for which the Standard is western agent.

The Standard Air Brake Company, E. J. Wessels, general manager, New York, has sold twenty air brake equipments for the 38-foot double truck cars of the Niagara Falls & Lewiston, N. Y., Electric Railway.

The Worcester Construction Company, Worcester, Mass., has prepared a booklet of electric street railroad information, a revision of the 1892 edition, as a guide to its patrons in estimating the cost of construction.

The Bryant rail saw, which is sold by the Q. & C. Company, of Chicago, has been earning warm encomiums, especially from street railway men, who deeply appreciate a saw that does not require any tearing up of rails.

The Cahall vertical water tube boiler, H. E. Collins & Co., Chicago and Pittsburg selling agents, which is made by the Aultman & Taylor Machinery Company, Mansfield, O., is fully described in a new May, 1895, catalog.

The Griffin Wheel & Foundry Company, Chicago, has nearly completed its new foundry building at Denver, Colo. Nearly all the machinery has been ordered, the Edw. P. Allis Company, of Milwaukee, having the contract for the engines.

The California Wire Works, manufacturing wire rope and railway cables at San Francisco, have been purchased by the Washburn & Moen Manufacturing Company, of Worcester, Mass., by which latter company the works will be continued in operation.

The Elliot Frog & Switch Company, of East St. Louis, Ill., which has made special work for many roads in St. Louis, has been reaching out and is now construct-

ing all the special work for the Los Angeles, Cal., Traction Company, as well as a number of other roads.

L. C. Fritch, president and general manager of the Washington Street Railway Company, Washington, Ind., is in the market for one second-hand Westinghouse engine, 80 to 100-horse-power; 3 pairs second-hand McGuire trucks, light weight; 3 second-hand G. E. 800 25-horse power motors.

Charles J. Mayer, Betz building, Philadelphia; Charles N. Wood, 180 Summer street, Boston; Sterling, Grant & Co., Detroit; Hodgman Bros., Commercial building, St. Louis; R. M. Clement, Mills building, San Francisco, have taken agencies of the International Register Company, Chicago.

C. E. Loss & Co. have secured the contract for 11 miles of electric road at Sheboygan, Wis. Seven miles of track used by the horse line are to be taken up and replaced and 4 miles of new track are to be laid. Illinois Steel Company shanghai rail will be used in business streets, and common rail elsewhere.

"American Street Railway Investments" for 1895 is at hand from the press of the Street Railway Publishing Company, Havemeyer building, New York. In 250 pages is gathered together a vast quantity of information bearing on the financial standing of every street railway in the United States and Canada. Price, \$3.

B. J. Arnold & Co., Chicago, have just completed the plans for the St. Charles Street Railroad, New Orleans, and are about to place in operation the plant of the Ft. Dodge, Ia., Electric Light & Power Company, using the General Electric monocyclic system, built on the Arnold patent system of power station construction.

J. F. Macartney, who is well known to electric street railway men, has accepted a position as salesman with the Ohio Brass Company, of Mansfield. Mr. Macartney is looking after the Eastern trade, with headquarters at New York City, and has been successful in securing some very nice contracts for the construction material of some large roads which are being built in New York and New Jersey.

The Ohio Brass Company, of Mansfield, O., has its new catalog ready for distribution to the trade. Devoted exclusively to those articles which are in general demand and most commonly used in the construction and maintenance of electric railways, its 150 pages should prove of interest to every street railway man who is concerned with electric traction, especially since many new devices have been added during the last year to the Ohio Company's complete line of material.

The Joseph Dixon Crucible Company, Jersey City, N. J., will be conducted by E. F. C. Young, president; John A. Walker, vice-president and treasurer; George E. Long,

secretary, who were elected to these offices at the recent annual meeting. This is the largest manufacturer of graphite products in the world, consisting of plumbago crucibles, graphite facings, retorts, and other goods used in foundries and smelting works, lubricating graphite, graphite greases, graphite paints, and Dixon's world-famed American graphite pencils and carburet of iron stove polish.

Edward M. Hagar has been appointed Chicago representative of the Southwark Foundry & Machine Company, Philadelphia, in place of F. W. Bunn, who has gone to the main office. Mr. Hagar was connected with the electrical department of the North and West Chicago Street Railroads. He graduated from the Boston Institute of Technology, and from Cornell, receiving from the latter the degree of M. M. E. He is a bright young man who seems to possess the characteristics of a successful salesman.

The Howe Scale Company, Rutland, Vt., has been reaching out and gathered to itself the Heath & Smith automatic cable car plant, Jersey City, Case coal elevator, Harrison coal conveyor, Rawson & Morrison Company, and Newell & Ladd Company, together with other companies, which are being reorganized and placed under one management. The cable plant has been moved to Rutland. With all these additional facilities the Howe Scale Company is able to improve on the character of its output, which has always been of the highest grade, as has been proven to the satisfaction of a large number of street railway companies.

J. H. Vail, 39 Cortland street, New York, has been engaged by the Wilkesbarre Electric Light Company, as supervising and contracting engineer for the building of a large electric light and power station. The company has purchased a valuable culm bank, containing upwards of 140,000 tons of excellent coal, and propose erecting a modern power house and new steam plant on the property. When the new station is completed the company will be in a position to manufacture electric current at as low a price as it can be produced in this country, excepting from cheap water power. The work is expected to be completed in from three to four months.

The Edw. P. Allis Company, of Milwaukee, Wis., is building engines for the Portland, Me., Railroad Company; Detroit, Mich., Railway Company; Detroit Citizen's Street Railroad Company; Union Depot Railroad Company, St. Louis, Mo.; Kansas City, Mo., & Independence Rapid Transit Company; Akron, Bedford & Cleveland, O., Railroad Company; Cleveland & Elyria Electric Railroad Company; Atlantic Coast Electric Railroad Company, Asbury Park, N. J.; Orleans Railroad Company, New Orleans, La.; Albany, N. Y., Street Railway Company; Staten Island, N. Y., Electric Railway Company; Cicero & Proviso Street Railway Company, Chicago, and West End Street Railway Company, Boston,

Mass. Many of these companies are having two or more engines built. The majority of the engines are to be direct connected to generators.

The Stirling Company, Chicago, has closed in the last thirty days contracts for boilers aggregating about 7,000-horse-power, among which are 2,700-horse-power for the Edison Electric Illuminating Company, Paterson, N. J., which is removing 1,250-horse-power of another make; 300-horse-power for Shore Electric Railway, Red Bank, N. J.; 300-horse-power for Yonkers, N. Y., Railway Company, a third order; 1,000-horse-power for Akron, Bedford & Cleveland O., Railway; 500-horse-power for Cleveland & Elyria, O., Electric Railway; and 500-horse power to Cincinnati, Newport & Covington, Ky., Street Railway, this being a second order. The Stirling Company has contracted with the Cotton States Exposition Company to furnish all the boilers, aggregating 3,000-horse-power, for the coming exposition at Atlanta.

H. E. Collins & Co., Bank of Commerce building, Pittsburg, sole sales agents for the United States and Cuba, for the Cahall vertical water tube boiler, manufactured by the Aultman & Taylor Machinery Company of Mansfield, Ohio, have made contracts recently with the Salem Iron Company, at Leetonia, for 250-horse-power; Aetna Standard Iron & Steel Company, Bridgeport, Ohio, 100-horse-power; Brown, Bonnell & Co., Youngstown, Ohio, 324-horse power; Carrie Furnaces, Pittsburg, Pa., 2000-horse-power; Canonsburg, Pa., Iron & Steel Company, 250-horse-power. The orders from the three first named are repeated orders. The boilers for the Salem Iron Company, and Carrie Furnace Company, are both for burning blast furnace gases and the others are for utilizing waste heat from heating furnaces.

The McGuire Manufacturing Company, Chicago, has arranged with the Leeds, Eng., Forge Company, to manufacture pressed steel truck frames under the McGuire patents. Orders for trucks have been received from the Madras, India, Electric Tramway; St. Charles Street Railroad, New Orleans, La.; Derby, Conn., Street Railway Company; Williamsport, Pa., Passenger Railway Company; Milwaukee, Wis., Street Railway Company; Chattanooga, Tenn., Electric Railway Company; Brazil, Ind., Rapid Transit Company; Cincinnati, O., Street Railway Company; Columbus, Ga., Railway Company; City Railway Company, Bloomington, Ill.; Calumet Electric Street Railway Company, Chicago; Ottumwa, Iowa, Electric Street Railway Company; Frankfort, Tacony, & Holmsburg Railway Company, Philadelphia, Pa.; McKeesport, Duquesne and Wilmerding Railway Company, McKeesport, Pa.; and Toledo, O., Consolidated Street Railway Company.

The Ball Engine Company, Erie, Pa., has furnished a 100-horse-power Ball engine to the Tarentum, Pa., Pas-

senger Railway ; a 150-horse-power Ball engine to the Baltimore, Md., Sparrow's Point & Middle River Railroad Company ; a 175-horse-power Ball engine to Suburban Traction Company, Orange, N. J. ; a 300-horse-power tandem-compound Ball engine to the Rock Creek Railway Company, Washington, D. C. ; two 125-horse-power tandem-compound engines to the Norfolk, Va., and Ocean View Electric Railway ; and one 400-horse-power vertical compound to the Camden, N. J., Horse Railway, being a duplicate of one delivered a few months ago. But the contract upon which the Ball & Wood Company prides itself, is that recently awarded by the Edison Electric Illuminating Company, Paterson, N. J., for its model plant, consisting of 5 Ball & Wood engines of the new type, of 600-horse-power each ; 2 of the same type of 700-horse-power, and 1 of 300-horse-power.

The Hoppes Manufacturing Company, Springfield, O., has recently furnished 2 heaters of 1,000-horse-power capacity to the Terre Haute, Ind., Electric Railway ; 4 of 9,000-horse-power to Cambria Iron Company of Johnstown, Pa. ; 1,100-horse-power to Columbus, O., Central Railway, and 2,250-horse-power to Rochester, N. Y., Railway, besides an aggregate of 4,125-horse-power to G. Buescher Sons, Moulton, Texas ; Beckett Paper Company, Hamilton, O. ; Joliet & Chicago Stone Company ; Abendroth & Root Manufacturing Company, New York ; Withington & Russell Company, Nashville, Tenn. ; F. & R. Lazarus & Co., Columbus, O. ; United States Heater Company, Detroit, Mich. ; "St. Louis Republic," St. Louis, Mo. ; Sheridan Electric Company, Sheridan, Wyo. ; Kansas Light & Water Company, Lawrence Kan. ; Indianapolis, Ind., Hominy Mills ; Kelley Axe Manufacturing Company, Alexandria, Ind. ; Tytus-Gardner Paper & Manufacturing Company, Middletown, O., and H. Guenther & Bro., Owensboro, Ky.

The H. W. Johns Manufacturing Company, New York and Chicago, has issued a very neat edition of its price list of trolley line and other insulating materials. New wood cuts appear throughout and several new forms are introduced ; notably their new "J. P." style of hanger and pull-offs, similar to the well-known West End type in design ; two new forms of bracket arm hangers, porcelain insulated guard-wire pull-offs ; alterations in the shape of their standard No. 1 and No. 2 Giant strains, the Grauten rail bond and circuit breaker, frogs, insulated crossings, etc. The last half of the price list is devoted to descriptions of special forms of molded mica and Monarch insulating materials, such as bushings, washers, telephone bases, etc., and special prominence is given to the Vulcabeston spools, washers, bushings and controller parts, which have become widely known through their almost universal use in electrical apparatus. Prices are also given of the Vulcabeston controller parts of the Westinghouse and General Electric Companies ; also for commutators rings and brush holder bushings for the street car motors.

Warren Webster & Co., Camden, N. J., specialists in examining steam plants where increased economy in fuel is desired by utilizing waste exhaust steam, report considerable activity in their business, by reason of a recognized appreciation of their manufactures in comparison with other apparatus for a similar purpose. Among the recent orders for the Webster "vacuum," feed water heater and purifier not reported since May, and in addition to numerous contracts for their vacuum system of steam heating, without back pressure upon the engine—Webster steam and oil separators—they mention :

Haldeman Paper Company (2 heaters), Lockland, Ohio, 1,000-horse-power ; Putnam, Hooker & Co., Cincinnati, 350 horse-power ; Philadelphia Construction Company, Philadelphia, 500-horse-power ; William Oswald, New Orleans, 75-horse-power ; Dominion Oil Cloth Company, Canada, 150-horse-power ; Harrisburg Foundry & Machine Company, Harrisburg, Pa., 300 horse-power ; Temple Elec. Co., Temple, Tex., 150-horse-power ; Buckner Orphans Home, Dallas, Tex., 100 horse-power ; Philadelphia Construction Company, Philadelphia, Pa., 1,000-horse-power ; Wilkesbarre & Wyoming Valley Traction Company (dupli), 1,200-horse-power ; Kittaning Electric Light, Heat & Power Company, Kittaning, Pa., 250-horse-power ; Morrison Plummer Company, Chicago, 200-horse-power ; Diamond Match Company, Oshkosh, Wis., 500-horse-power ; Enterprise Machine Company, Minneapolis, 50-horse-power ; Chas. Rosser, Moundsville, W. Va., 150-horse-power ; B. F. Gentsch & Sons, Buffalo, 100-horse-power ; Seltzer & Bro., Pottsville, Pa., 200-horse-power ; H. Belfield & Co., Philadelphia, 200-horse-power ; Deering Harvester Company, Chicago, 1,250-horse-power ; Knox Hill Company, Warsaw, Ill., 100-horse-power ; Mississippi Cotton Oil Company, Vadalisa, La., 250-horse-power ; Mississippi Cotton Oil Company, Jackson, Miss., 250-horse-power ; Kaukauna Fibre Company, Kaukauna, Wis., 175 horse-power ; Thilmany Paper Company, Kaukauna, Wis., 150 horse-power ; Wire Goods Company, Worcester, Mass., 150-horse-power ; Badger Paper Company, Kaukauna, Wis., 500 horse-power ; J. J. Kenyon, Pawtucket, R. I., 300-horse-power ; P. H. Potter, Springfield, Mass., 300-horse-power ; Nonantum Worsted Company, Newton, Mass., 1,600 horse-power ; Amory Manufacturing Company, Manchester, N. H., 1,500-horse-power ; Freeland Electric Light, Heat & Power Company, Freeland Pa., 320-horse-power ; G. L. Brownell, Worcester, Mass., 100 horse-power ; Boston Rubber Shoe Company, Malden, Mass., 600-horse-power ; Jay Paper Company, Jay Bridge, Me., 500-horse-power ; Henry Frey & Co., Boston, 250-horse-power ; Uncas Paper Company, Norwich, Conn., 600-horse-power

Charles J. Mayer, of Philadelphia, is soon to open a warehouse where he will keep a stock of all the numerous high grade specialties which he handles. This move on his part is the best evidence that his specialties are what they are represented to be, that could be obtained. It shows that they have been adopted as standard by a great many roads, for if it were not so, there would be no necessity of keeping a large stock. The R. D. Nuttall Company's specialties form the bulk of Mr. Mayer's business, and he has had great success with its trolley. The Philadelphia Traction Company uses more than 1,100 of them. The Electric Traction Company, Hestonville, Mantua & Fairmount Passenger Railway Company, and many others use large numbers of the Nuttall trolleys. Mr. Mayer has furnished the entire equipment for 150 miles of overhead work in the vicinity of Philadelphia. He will furnish all the overhead material for the Seventh, Ninth and Columbia avenue and the Market street line of the Philadelphia Traction Company. Mr. Mayer is selling a great many Nelson overhead insulated crossings and frog switches. He has made arrangements to represent the Partridge Carbon Company, Sandusky, O., and the International Register Company in the middle states.

The Portable Hose Bridge Company, Detroit, Mich., has received sample orders from its Boston agents, Thompson-Brown Electric Company, for bridges for Public Works Company, Bangor, Me., and its western agents, Metropolitan Electric Company, Chicago, for Albany, N. Y., Railway Company and Chicago Transit Company; also orders from New Orleans City & Lake Railroad Company, Citizens Street Railway Company, Indianapolis; and Toledo, O., Consolidated Street Railway Company. The company has just received the following letter from John Winter, assistant general superintendent of the Detroit Citizens Street Railway Company:

"We have used your hose bridges on our roads in time of fire and found them a great convenience in allowing our cars to run on time, and also have found them a paying investment in saving blockades and delays. We fully recognized the necessity of your bridges at the Keenan & John fire on Woodward avenue, when we had four roads tied up and our cars blocked, but through the kindness of the Fort Wayne road, who loaned us your bridges we were enabled to overcome the difficulty; and since ordering bridges from you, we have used them a number of times and have no hesitation in recommending them to any road in the country, as being the best contrivance that we know of ever made for the purpose. We will be pleased to say a good word for you at any time."

LEWIS & FOWLER AFFAIRS.

The Lewis & Fowler Manufacturing Company and the Lewis & Fowler Girder Rail Company, of Brooklyn, will probably be consolidated, as the best way out of their difficulties. The reorganization proposes a new company with \$200,000 capital and \$200,000 bonds. One share of the stock will be given for two shares of the Girder Rail stock, or three shares of Manufacturing stock, and stockholders will have the privilege of subscribing for bonds. The new company will make special work for tracks, electric snow plows and sweepers, car registers, and all kinds of brass and bronze fixtures for cars.

Albert H. Dollard, formerly president of the two companies, has been indicted by the Kings county grand jury. The indictment charges him, as executive officer of the companies, of having signed a declaration of a dividend when not only was there no surplus with which to pay it, but the companies were insolvent.

Harry Garfield has been appointed superintendent of the Turners Falls & Greenfield, Mass., Electric Railway.

W. A. H. Bogardus, general manager of the Brooklyn Heights Railroad Company, Brooklyn, N. Y., has resigned his position, and contemplates forming a connection with a New York business firm.

Charles Cleminshaw, president of the Troy, N. Y., City Railroad Company, has sailed for Europe on an extensive tour of the east. During his absence his duties will be attended to by Francis N. Mann, who has been elected temporary acting president.



Dennis L. Miller has taken charge of the Ohio Falls Street Railway at Jeffersonville, Ind., as superintendent.

A. M. Soper, representing the New Haven Car Register Company, has been west on a most successful business trip.

Frank A. Estep, president and treasurer of the R. D. Nuttall Company, Allegheny, Pa., favored the REVIEW with a pleasant call.

Louis W. Merrifield has been appointed superintendent of the City Electric Railway, La Salle, Ill., in place of Mr. Davids, who resigned.

Robert A. Kline has been appointed superintendent of the new electric road between Passaic and Hoboken, N. J., making his headquarters at Rutherford.

Charles L. Bonney, vice president of the Chicago General Street Railway Company, is in London, collecting data relating to omnibus and street car traffic.

Col. Thomas Lowry, president of the Twin Cities Rapid Transit Company, Minneapolis, is home again from his ocean voyage and business visit to London.

Electrician Willard, of the New Orleans, La. Traction Company, has been promoted to the position of general manager, made vacant by the resignation of H. M. Littell.

Frank L. Perry, assistant business manager of the Western Electrician, is to be married June 27, to Miss Lucretia Faulkner, at the First Presbyterian Church, Chicago.

W. D. Larrabee, well known as chief engineer of the Los Angeles, Cal., Consolidated Street Railroad, has been given the position of Superintendent of the Pasadena & Los Angeles Electric Railway.

F. S. Hoskins, late of Minneapolis, has been made superintendent of the Atlantic Avenue Railroad, Brooklyn, N. Y., in place of Daniel J. Quinn. The latter will continue with the company in another capacity.

H. H. Littell, general manager of the Buffalo, N. Y., Railway Company, has worked so hard in bringing his charge up to its present state of perfection that it has become necessary for him to take a complete rest. On June 10 Mr. and Mrs. Littell and the little Littells sailed on the *Normania* for Europe. Landing at Hamburg the party will proceed by way of Berlin and Dresden to Carlsbad where they will stop for some time. After a tour through Switzerland and a visit to Paris and London the family will return home in the latter part of September.

AMERICAN ASSOCIATION AFFAIRS.

Several important measures were discussed at the special meeting of the executive committee of the American Street Railway Association, held at the Hotel Waldorf, New York, at the time the last issue of the REVIEW was being delivered to its readers. Col. John N. Partridge, president of the Brooklyn City & Newtown Railroad Company, was appointed secretary pro tem, and will exercise a general supervision over the affairs of the office.

Several measures were discussed, which if presented to the association and adopted, will compel radical changes in the constitution. One of the most important affects the office of secretary. It is suggested that the duties of the secretary be enlarged, so that he shall be an encyclopedia of all kinds of information, statistical and otherwise, for the benefit of members, who may call upon him at any time. As this service will cost money it is proposed to change the basis of annual dues, so that members shall pay a certain per cent of their gross receipts, which is fixed at 1-10 of a mill on the dollar, except that the minimum of \$25 a year shall be fixed. On this basis a company whose gross receipts are \$250,000 a year would pay \$25 and have no grounds for objections, provided it felt that it was getting value received. Smaller companies would be assessed out of proportion, one whose gross receipts were \$25,000 paying ten times as much as it ought. A company whose gross receipts were \$4,000,000 would be asked for \$400.

None would object if it can be shown that the benefits are in proportion to the cost, but it will require a great deal of persuasive eloquence on the part of the officers of the association to convince \$4,000,000 companies that it is worth \$400 to belong to the association. "It simply amounts to an attempt on the part of the association to assess our gross receipts that amount," said a manager of a large company who happened into the REVIEW office, "and the association has no power to make such assessments. The association is a sort of club, which benefits all alike. I am not in favor of clubs requiring a millionaire to pay more dues into a club simply because he is a millionaire, than a man who is on a salary. The same benefits are open to both, if they will use them. The association so far has been a big club, and the same principle of obtaining revenue should apply there as in a social club. If the association needs more money, let it call for voluntary contributions."

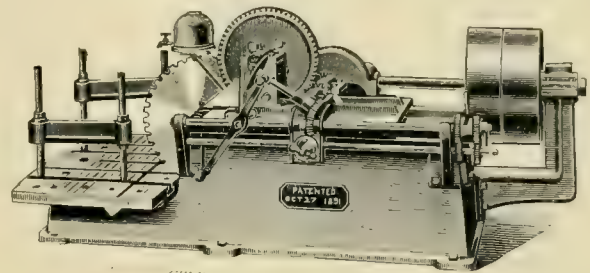
It is also proposed to give members of the executive committee longer terms of service, as it has been proven that as soon as members become in touch with all the details, their terms of office expire. It is the intention to recommend to the association an increase in the committee from nine, including the four officers, to ten, which will make six elective members, in addition to the president and three vice presidents. At Montreal it is proposed to elect two members for one year, two for two years, and two for three years, making the regular term three years, so that two members will retire each year.

It is also proposed to give the president a two-year term.

Four days are suggested for holding annual sessions instead of three. It is the intention to have fewer papers and more discussions. A session every day for members exclusively is recommended, instead of only one during the convention, as has been the practice.

BRYANT METAL SAWING MACHINE.

Quite a handy sort of machine to have around the shops is one that will saw metal, and it is often desirable to have one that can be carried around for use on the right of way. The illustration shows the No. 10 Bryant metal sawing machine manufactured by the Q. & C. Company, Chicago, a fac simile of one set up in the shops of the Chicago City Railway Company. The No. 10 machine has been reconstructed and improved and is recognized as one of the most substantial and valuable cold saws on the market. It does not take up much room, is designed to belt direct from main shaft, being equipped with tight and loose pulleys, and no counter



shaft is necessary. For general work the machine requires 2-horse-power, but for light work can be driven by a ½-horse-power electric motor. This machine is largely used by street railway companies. Its capacity is straight cuts of 18 inches or less, and mitres up to 15 inches. The Q. & C. Company also makes a convenient portable rail saw designed especially for steam and street railroads, which will cut rails, beams, channels, etc., up to 9 inches high and at an angle up to and including 45 degrees. It can be operated by one man, but two can do quicker work, cutting an ordinary rail in from 6 to 12 minutes, leaving the rail smooth and true. The saw blade is hollow ground and acts as a rotary planing center. The machine will be found of great value in cutting rail ends, and in making crossing and switch lay outs. All feed gears, etc., are cut from solid steel. The machine is built in two sizes, one weighing 260 pounds for rails up to 7 inches and the other for rails up to 9 inches.

Superintendent Wellman, of the Buffalo, Tonawanda & Niagara Falls line, has resigned his position to take up his duties in the Wellman & Heller Electrical Company.

FOR YOUR OUTING GO TO PICTURESQUE MACKINAC ISLAND.

One Thousand Miles of Lake Ride at Small Expense.

Visit this historical island, which is the grandest summer resort on the great lakes. It only costs about \$13 from Detroit, \$15 from Toledo, \$18 from Cleveland, for the round trip, including meals and berths. Avoid the heat and dust by traveling on the D. & C. floating palaces. The attractions of a trip to the Mackinac region are unsurpassed. The Island itself is a grand, romantic spot, its climate most invigorating. Two new steel passenger steamers have just been built for the upper lake route, costing \$300,000 each. They are equipped with every modern convenience—annunciators, bath rooms, etc., illuminated throughout by electricity, and are guaranteed to be the grandest, largest and safest steamers on fresh water. These steamers favorably compare with the great ocean liners in construction and speed. Four trips per week between Toledo, Detroit, Alpena, Mackinac, St. Ignace, Petoskey, Chicago, "Soo," Marquette and Duluth. Daily between Cleveland and Detroit and Cleveland and Put-in-Bay. The palatial equipment makes traveling on these steamers thoroughly enjoyable. Send for illustrated descriptive pamphlet. Address A. A. SCHANTZ, G. P. A., D. & C., Detroit, Mich.

DON'T LIVE SO FAST.

In these days the active business man goes plunging through life taking better care of his friends and customers than he does of himself. One week laps on to another and the promised breathing spell is put off until cold weather settles the question for that year. As a matter of business, you will live longer, and thus make more money; to say nothing of chinking in a few pleasure stations along the express trip of life, if you will simply decide now, even as you read this suggestion, that you will take a few days or a week off. What you want is a positive change of scene, of air and surroundings. Pine woods, clear, cool lakes and streams, and incidentally the finest of fishing; these are very fetching inducements to a tired man. But you want some retired nook where you can dress as you please and good comfortable hotels with meals you can eat, without spending a month's profit for a few day's accommodation; and then you can't go so very far. A night's ride or less is all right for an emergency call home; but where can a body find all this?

The Wisconsin Central Railroad has made a famous record as furnishing all these requirements. All along its line are any number of attractive spots where good hotel accommodations are in abundance. And lakes—why its route is along an almost continuous chain of lakes. There is Silver

Lake, Channel Lake, Brown's Lake, Lake Beulah and Phantom Lake; and each has from one to six others connecting. At Oshkosh, Lake Winnebago affords long steamboat trips and abundant fishing. Then there is the charming "Chain of Lakes" at Waupaca, where a dozen spring-fed lakes lie nestled among the pines, each connected by streams affording delightful boating and excellent fishing.

Here also the hotel accommodations are good and reasonable, making it a very popular family resort. For those who want wilder scenery and country, press on to Fifield, noted for its magnificent black bass, and likewise Phillips on Elk lake. Butternut lake is another and boasts the fierce muskallonge.

Any and all of these points are within a short ride of Chicago, and round trip rates have been made very low.

For a satisfactory description of the above and dozens of other lake resorts on the Wisconsin Central, our readers should send for that charming and handsomely illustrated guide book, "Our Summer," by J. C. Pond, G. P. A., Wisconsin Central R. R., Milwaukee, or to G. K. Thompson, City Passenger Agent, 204 Clark St., Chicago, who will send it free to any address.

W. S. Louttit, Chicago, is Western agent for the Sterling fender, and not the Crawford fender as reported.

Jonathan H. Vail, a director of the company, has been appointed temporary receiver of the Electrical & Mechanical Engineering Company, New York. The liabilities are \$26,000 and assets exclusive of patents, less than \$22,000. The preferred claims amount to \$12,000.

TWO THINGS...

To enthuse over: The healthy growth in commercial conditions, and the new Standard Arc Lamp. Doubt and despondency are fast disappearing, followed by the cumbersome, expensive and defective arc lamps that have caused such depression in spirits and in the receipts of the owners. But now a little energy, a little enthusiasm, and an equipment of the new Standard Arc Lamps will accomplish all that is possible of accomplishment.

Perfect mechanically, efficient electrically, moderate in price, weatherproof.

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H. H. WINDSOR,
Editor.

F. S. KENFIELD,
Business Manager.

CORRESPONDENCE.

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

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THE temptation to utilize old horse cars as trailers to electric cars is great, and in many cases a good plan. Much depends, however, on the old horse car and particularly the condition and arrangement of its running gear. Such a trailer on the Steinway Electric Line, Long Island, while rounding a curve at high speed jumped the track and landed the passengers in a stagnant pool of water the mud and slime of which undoubtedly saved many from serious accident. The lesson is a pointed one that there is a vast difference between horse car practice and electric operation, and that in attempting to utilize one in the service of the other due care should be exercised to make the adaptation safe.

ONE of the roads in this city has an interesting case to defend and one in which its conductor acted contrary to his instructions. It is a case of ejection of a passenger who tendered his fare in five pennies instead of the nimble nickel, and the conductor having little or no sense refused to add to his store. The passenger who happens to be an old man of seventy refused to tender other money and was thereupon, so he claims, ejected from the car, and his basket of merchandise cast after him. He now sues for as many thousand dollars as the pennies tendered. As a matter of fact cent coins are a legal tender to the amount of 25 cents in any one payment just as fractional silver is a legal tender to an amount of ten dollars. While

it is annoying to a conductor to be obliged to lug two or three pounds of copper around in his pocket, there seems no help for him other than to do as he is done by and feed out the coppers which he can legally do in amounts not exceeding 25 cents. It is easier said than done, however, as most conductors would rather make other change to a passenger than be involved in the quarrel which is almost sure to follow an attempt to unload.

"THEY are always getting bent and broken; our motor-men and conductors cannot handle them without getting hands and clothes greasy so that they are not presentable for service; in exchanging from one end of the car to the other our men hang them on the dash with a jerk and jam that breaks chimneys and demoralizes the headlight generally besides scratching and marring the dashboard. It takes one man's time to look after them even on our small road, and they are a constant annoying expense to maintain. What is the use of all this? If the trolley current gives out, a car does not need any light. If the trolley current is on there is plenty of light to do any repairing on the motors, although we are not in the habit of doing repair work on the road. This oil headlight business for electric cars is the most absurd thing I ever heard of." Such is the opinion of one superintendent and the increasing use of electric headlights seems to show that there are others that think he is not very far wrong.

ALL street railroads are compelled to meet practically the same opposition in their beginnings. For reasons fancied and not very weighty, right of way is refused, yet after a road has been built, those who fought hardest against it, would be as earnest in urging its continuance, if there were a move to tear up the tracks. An old settler of Chicago recently said, "The introduction of these first surface lines met with the same opposition from property owners, that the elevated and trolley lines now encounter. In fact it was often necessary to purchase the consent of property owners and even to buy property in order to secure the necessary frontage." Where would the city of Chicago be to-day if it had not been for its lines of street railway? Where would any city be without its street railway systems? Just in the same condition they were before they had this means of transportation. Even Ottawa, Ill., now that she has lost her road, is beginning to find out what it is to be without a street railway, and her newspapers are full of tearful accents, having changed their tune from dictatorial demands, which have been granted, to cringing supplication for the return of what the people threw away. It is a short sighted policy that opposes any project that tends towards the advancement of a community.

A BILL has been pending in the Massachusetts legislature, and already passed the House, requiring one electric railway to haul the cars of any other company which may desire to use its tracks. Of course there

would be some compensation determined probably on a mileage basis, but the law is bad and if ever passed, calculated to do much damage. Take for instance a small blackmailing road, which by the construction of an infantile power house at purely nominal expense,—or renting power from some lighting company—and laying a half mile of a track out in some unimportant part of the city, would in law answer all the requirements for a full fledged electric railway corporation. By connecting with some large system, and the purchase of necessary railway stock, it could run its pirate cars over the lines of heaviest travel during the morning and evening hours of most profitable travel, and on holidays and similar occasions. In this way it would, with an outlay insignificant with that of the large road, skim the cream of its business and leave the large company to do all the unprofitable service with only a share of that class of riding without which no line can exist or furnish a decent service. The operating of cars and equipments of styles which may not conform to the standard of the road used; the almost certain inability to locate damage to track and overhead work; the sudden delage of pirate cars stalling the entire system; the confusion of rules where men are subject to two masters; would all tend to promote dissension among the two sets of employes, and the public would suffer in a greatly increased accident hazard and disturbed regularity of service. It amounts when all is said, to an iniquitous lending of legislative power to coerce existing companies to become unwilling purchasers of undesirable and unnecessary lines, some of which are already built and their owners doubtless see no other relief from the miserable financial condition into which they have come from bad judgment and poor management.

PEOPLE who complain on account of the grants of free franchises to corporations, do not consider the fact that it is the development of the franchise that makes it valuable. The mere act of passing an ordinance is of little value, unless something is done towards using the rights that are therein granted. Even if rails be laid and no cars run, the franchise may be of no value to its owners, and it is certainly worthless to the citizens, except to those who use the rails to drive on. The city or town that grants a franchise to a street railway company receives more direct revenue from its presence, than it would without it. The first effect of a street railroad, even before it is in operation, is to increase the value of the real estate abutting and tributary to its right of way. Better transportation facilities attract more settlers, who improve the real estate by creating a necessity for more buildings, which further adds to the value of property, and brings in larger revenue to the municipality in the shape of taxes. Meanwhile, what is the street railway company receiving for its compensation? An individual who could increase the revenues of a private corporation in the same proportion would be paid at least 33⅓ per cent of the increase without a murmur, and the owners would pay all expenses. The railway company

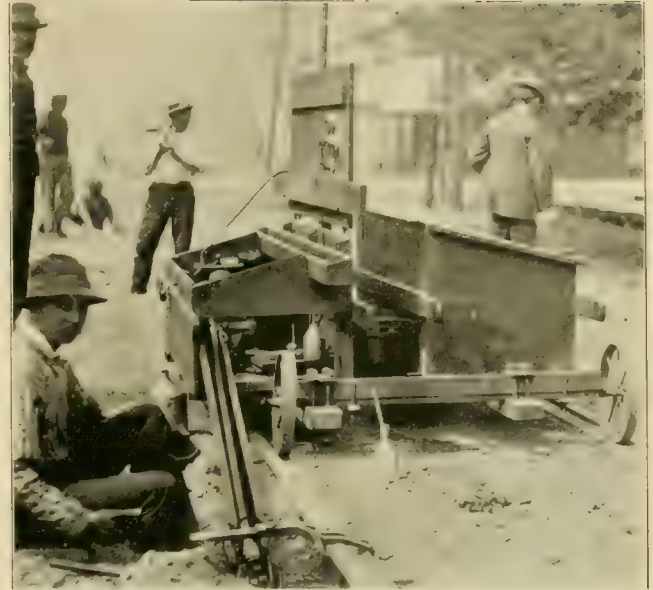
pays out a large amount of money at the start, and must be content to wait for years, it may be, before it earns a fair interest on its original investment. All the time it has been spending money in making extensions that benefit the town, and continue to add to the taxable value of property, and when it has reached the limit of its extensions, and is beginning to earn a little something, there is a big howl that the company ought to have paid for its franchise. The street railway does pay for its franchise every year more money in taxes and in license fees, and paving streets, than is paid by other corporations with an equal amount of capital invested. Still, there is an impression that it costs nothing to run an enterprise of this kind, and that every nickel received in payment of fare is clear profit for the company.

ONE of the lines in Newark, N. J., has stopped its equipment of winter cars and is running an equal number of open cars to the great delight of the populace. The city, however, claims a license tax on each open car, notwithstanding the company has already paid its license for the year on each closed car. In other words, the city claims a full year's license tax on both the open and closed car-equipment, although neither car will be in use a full year and the opens cannot possibly stay in service to exceed five months. The attempt is unjust, illogical and will not hold in law. As well say if the closed cars on which tax has been paid, were burned a week later, that the same number of new box cars to replace them would carry a fresh license. What the city can probably do is to collect \$10.00 per car on the greatest number of cars at any one time in service during the year. Yet even this is manifestly unfair, as there may be only a few occasions during the whole year when the company would have need of more than either its closed or open equipment. There is grave doubt as to the right of cities to inflict the license at all, although it is done in the larger cities. Since electric and cable traction have been introduced there is absolutely no wear on the pavement by the street railway company, which in many cases is required to pave that portion of the street occupied by its tracks. The company pays heavy state, city and county taxes and really should be exempt from any such burden as a car license. Companies are already under heavy expense in maintaining two sets of equipment half of which must be useless six months in the year. The manager of a road in one of the smaller cities, writes us he is threatened with a car license; we know of our own knowledge that he is giving the citizens a service far in advance of what his business warrants. To impose a car license in such places, simply means that much more expense without a penny additional revenue and the only alternative for the prudent manager is to curtail, which means not so good accommodations. By this method the public lose more than they gain, for while the license is a big item to the road, it is only a drop in the bucket to the municipality.

ELECTRIC TRACK DRILL AT SOUTH CHICAGO.

The South Chicago City Railway has effected a great saving of time and money while redrilling and rebonding its track this summer by the use of an electric track drill. This application of shop practice to outdoor work was made by B. J. Jones, superintendent of the road, and the idea is a commendable one in every way. The drilling outfit is shown in the engravings. Power is taken from the trolley wire to run a 1 horse-power shunt wound Crocker-Wheeler motor which runs at 1,100 revolutions a minute. This is geared to a flexible shaft which in turn is geared to the drill. The speed of the drill is 125 per minute, this being a $\frac{5}{8}$ -inch drill. The flexible shaft is run in a trough. The motor and starting box are set in a sort of tool box on a very light flat wheeled truck which runs on the tram of the rail but can be lifted from the track by four men when cars come along. The trolley wire connection is made by a wire with a hook on the end. It is run up through a $\frac{1}{4}$ -inch gas pipe covered with wood. A fish pole was found to be too light for this work.

With this apparatus two men can accomplish at least four times as much in a day as with hand drills. The whole outfit cost only \$240, so that it does not take long for it to pay for itself where there is much work to be done. It was the intention at first to operate this drill only at night after traffic ceased, but it was found better to work in the daytime, and have two men from the gang that is tearing up the pavement assist the drill men in lifting the outfit off the track when cars come along. With an electric drill which can do such cheap, rapid work, it is a question whether it pays to have the holes for the bonding drilled at the mills. The cost of large holes for bonding when drilled at the mills is about 5 cents each. Besides this, if a hole is drilled at the mills it is so rusty by the time bonding is to be done that it has to be reamed out. This reaming out costs nearly as much if not quite as much as drilling, especially if the electric drill is used.

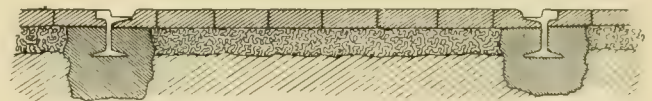


Power is not always available on a new track, but the trolley can generally be strung sooner than it is, in present practice, if it is desired to operate the drill. Altogether it is safe to predict an extensive use for the electric track drill in the near future. The apparatus is not confined in its use to track work, but can be used anywhere around an electric railway plant.

TRACK CONSTRUCTION WITHOUT TIES.

Novel Plan Tried at Toronto, Montreal and Detroit.

Track construction without ties sounds like an absurdity but such track has now been laid and tried for so long that it can hardly be called a novelty. S. R. Break, superintendent of the Detroit Railway, writes us that he is using the method on from $1\frac{1}{2}$ to 2 miles of track on that road. The rail is laid without ties by making trenches 1 foot wide and deep enough so that 6 inches of concrete can be put under the rail. Tie rods are put every 10 feet and the Detroit Railway is using 7-inch girder rail. This style of construction is suited to streets



TRACK WITHOUT TIES.

that are permanently paved before the tracks are laid. The class of pavement most suitable is asphalt or brick, as this class allows the concrete to come much nearer the top of the rail than pavements with deep blocks. Mr. Break reports that he has used this style of construction in Toronto and Montreal for two years past, and it has given good satisfaction. This track is a very radical departure from all established methods and it will no doubt be inspected with interest by those going to the convention next October, as it can be seen both at Montreal and at Detroit,

WAUKESHA BEACH RAILWAY.

The building of extensive and substantial electric interurban roads has flourished more in the eastern states than in the territory west of Chicago, on account of the more dense population. There are, however, a number of electric interurbans in the west which are the result of special conditions. The most recent and most creditable acquisition to this list is the Waukesha Beach Railway which has been in operation about a month and a half, and was formally dedicated to the service of Waukesha on June 25, C. E. Loss & Company, the well-



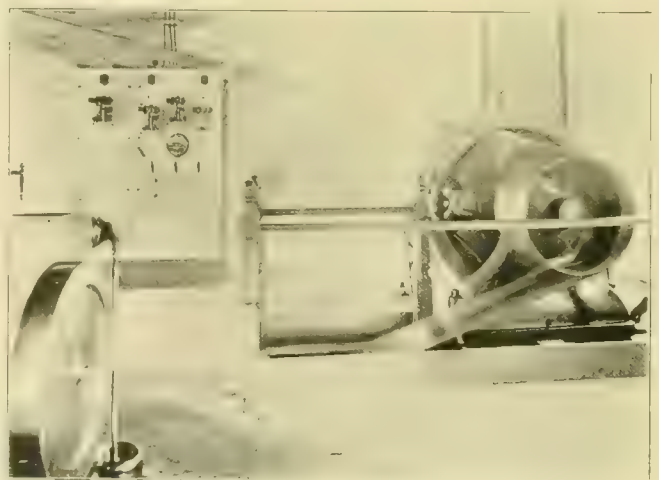
WAUKESHA TERMINUS

known railway contractors, of Chicago, have done themselves proud on this piece of work, and it is of so substantial a character that it will, without doubt, stand to carry many generations of Waukesha visitors. Waukesha is situated 20 miles west of Milwaukee and has within the last few years, owing to the enterprise of its local capitalists, become of national reputation on account of its mineral springs, and it is now one of the best-known resorts of wealthy people from Chicago and Milwaukee. Aside from its spring water and the beauties of the town, Waukesha has had, previous to this summer, no attractions to make it popular as a resort. The new road, which is six miles long, brings it within easy reach of Pewaukee lake, a beautiful sheet of water about six miles long and a mile and a half wide. It is expected by the Waukesha men who built the road that it will not only prove a paying investment in itself, but will do much to increase the attractions of Waukesha.

The road is intended simply for summer pleasure travel to the lake and will, probably, be shut down in winter. It is six miles from the terminus at the Northwestern Railroad depot in Waukesha to the beach of the lake. The railway is carrying out extensive improvements at the beach, which it owns, and it will be a beautiful spot in the course of a season or two. The railway bought and fenced its entire right of way, and the construction is much the same as that of a good, solid, steam road, except that the grades are heavier and some of the curves sharper than would be called good practice unless in a mountainous country. The rails are standard 60-pound T rolled by the Illinois Steel Company. An abundance of gravel ballast was obtained

along the route, and the contractors have put in a very solid roadbed over which trains run as smoothly as if on the best steam trunk lines. The time usually taken between one terminus and another is about 15 minutes. The schedule, including switching at terminals, is a round trip every 40 minutes. A trip has been made in 12 minutes. Usually there are no stops between terminals. Two trains are kept in operation. The rolling stock consists of three motor cars and four trailers. All are open except one motor car which is closed. They are all 37 feet over all and the open cars have twelve seats. They are Pullman build mounted on Brill maximum traction trucks. The motor equipment consists of two 50-horse-power Walker motors to each car. The Walker company has been devoting special attention to motors of this class for interurban service, and the results in this case are very satisfactory. The power plant contains a 250-horse-power Allis corliss engine and a 150-kilowatt Walker generator and switchboard apparatus. The trolley line is divided into three sections, each fed separately.

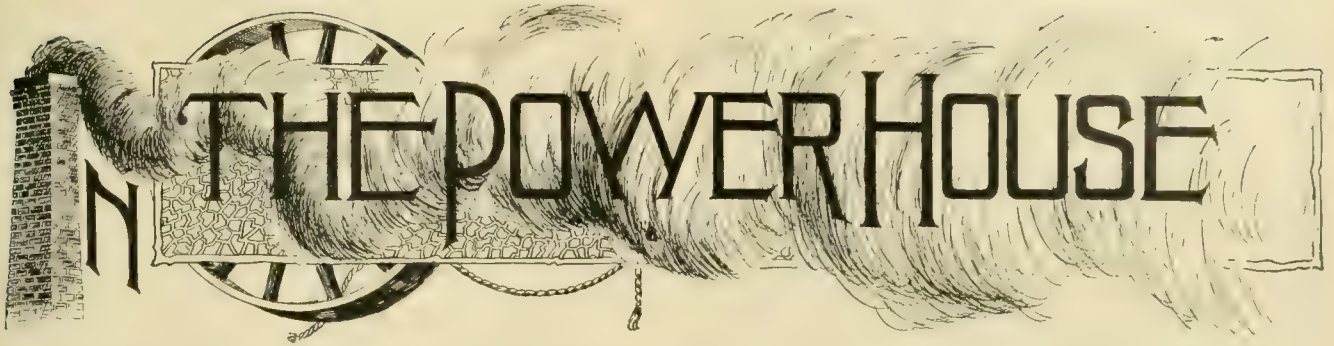
The profile of the road as furnished us by William Powrie, the engineer, shows that from Waukesha a climb is made of 140 feet in the first three miles and a descent of about 90 feet in the last three. The heaviest grade is 3.2 per cent. The deepest cut is 7 feet and the greatest fill 7 feet. Outside of the city limits of Waukesha there are no curves of more than 6 degrees, and when not too heavily loaded or when running down



WALKER GENERATOR AND SWITCH BOARD.

grade the cars make 40 miles an hour around them. At the crossing of the Fox river in Waukesha a plate girder bridge 50 feet long was erected. At the C. M. & St. P. Railway crossing interlocking home and distant semaphore signals were put in so that trains on neither road stop unless compelled to by the signals.

A. M. Jones, president, who is well known under the familiar name of "Long Jones," entertained a party of Chicago men at the time of the dedication, as did also the contractors, C. E. Loss & Company. The operation of the road is under the charge of C. L. Jones, formerly of the Milwaukee Street Railway.



This department is devoted to the construction and operation of electric railway power houses. Correspondence from practical men is specially invited. Both the users and makers of power house appliances, are expected to give their views and experiences on subjects within the range of the department.

A good example of what a lot of damage a little carelessness can do in a power plant was furnished by a man in a Canadian power plant last month. While trying to scrape the commutator of a big direct connected generator with a knife, the knife was drawn in and short circuited the machine, doing a good deal of damage both to aforesaid attendant and to the machine. Throwing this machine out put such a load on another generator in the same station that it was thrown out of line and part of the foundation gave way.

* * *

A test of different steam pipe coverings was made for the purpose of determining which was the best to use in a new pumping station of the St. Louis waterworks. The results are given in a paper before the Association of Engineering Societies by John A. Laird, of St. Louis. Two methods were employed. One was to note the condensation from a given amount of steam passing through a pipe in a given time. The other was to let steam into a pipe and close both ends, noting the fall in pressure in a given time. Both methods gave substantially the same results. The comparative condensation of water with the different coverings, was as follows :

Magnesia (plastic).....	334.
Magnesia (sectional)	335.3
Asbestos fire felt	367.5
Asbestos sponge moulded	371.3
Fossil meal.....	376.2
Plaster of Paris and sawdust.....	438.
Asbestos fire felt cement.....	563.7
Asbestos sponge cement.....	604.
Bare pipe.....	1085.

* * *

A gas works near York, England, has a method of shipping coal from the mines to its works that might be copied with economy by some of our large railway power plants. It saves all shoveling of coal until it reaches the furnace door. A number of boxes are made to fit into the box of an ordinary coal car, and are filled at the mines in the usual way. When a car of coal arrives at the plant, the boxes are lifted out and put on

trucks which run on a narrow-gage tramway, running in front of the furnaces. These boxes are mounted so that they can be dumped, and coal is handled at very slight expense. When the boxes have been dumped, they are put back in the coal car and go back to the mines. Even without the tramway feature, this plan saves labor if the railroad track runs into the boiler room.

* * *

The most amusing and also the most costly mistakes that were made in the early electric railway power plants were those of location. Electricians in those days seemed to have a great terror of spending money for copper and great care was taken to plant the station exactly at the center of distribution, no matter how far it was from coal and water. "They picked out a quarry among the cornfields ten blocks from the railroad tracks" said a railroad president recently, lamenting the judgment of the men who installed his plant. They rejected a lot he had purchased which was a mile further from the center of distribution but on a steam road, "because the drop of voltage must be considered." As the plant grows larger the expense of coal haulage grows and so does the disgust of the president, who knew nothing about drop in voltage when the plant was put in, but did know a little of common sense business principles.

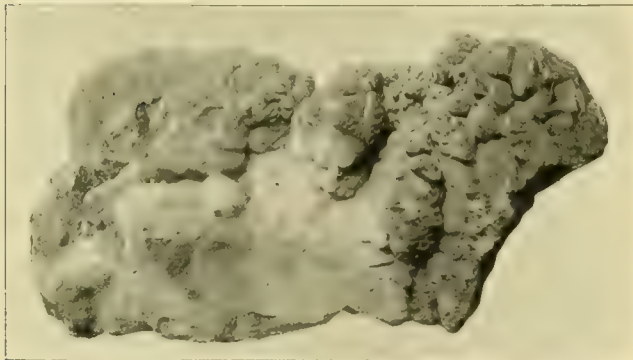
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The bucking of generators is a subject which has not been discussed in electrical literature enough so that it is generally known as one of the troubles that, although rare, may occur in any station using compound wound generators. In fact it is a question whether the majority of power house engineers know anything about this phenomenon, although it is familiar to a few and to the electrical manufacturing companies. Bucking of the kind we refer to on a generator occurs when the load is suddenly thrown off by the opening of the circuit breaker by an overload. The circuit breaker opens only one side of the circuit so that the series field coils are still left in parallel with the other machines. The shunt circuit is closed whether the circuit breaker is open or not, so that when the circuit breaker does open, the fields are still left with their fullest excitation. The result of this is sometimes, that, by the self induction of the armature an arc is started entirely around a commutator, and owing to the short circuit which this arc causes the machine bucks, giving itself and engine a violent jerk.

It is impossible to state whether this will happen with all types of generators. It can be prevented by not giving the brushes too much lead. One manufacturing company has provided against this trouble by recently changing its circuit breaker so as to cut out equalizer and positive instead of simply the negative pole. Bucking of motors is now very generally understood, but bucking of generators is of not so common occurrence and hence little is heard of it. Its consequences nevertheless may be serious and at least one bad accident in the last two years was probably caused by it. The shock on the machinery is worse than that of an ordinary short circuit occurring when the machine is working on a load, because it comes immediately after the load has been thrown entirely off. The effect is the same as putting a short circuit on a machine that has no load on. The load rises like a flash from zero to infinity, hence the enormous strain.

* * *

The accompanying engraving is of a piece of scale formed from Lake Michigan water, around a piece of coke in a Hazelton live steam heater, at the Twenty-first



street cable plant of the Chicago City Railway. This heater is one in which live steam and feed water are fed together into the top of a cylindrical iron tank, and the water filters down through coke, passing off to the boilers at the bottom.

* * *

The problem of keeping down the expense due to boiler scale, is in some stations the most serious one to be met. The machinery runs along very smoothly as well cared for machinery is wont to run, but do what he may, the engineer sometimes finds that the accumulation of scale is slowly but surely gaining on him, that the parts that can not be got at directly, are becoming heavily coated, and that it is only a question of time when the boiler will have to be taken apart at great expense. This is specially true with horizontal return flue boilers, where there is a nest of flues, among which it is impossible to clean thoroughly, and with water tube boilers having inaccessible tubes. The only way out of the difficulty is to use boilers that can be thoroughly cleaned over their entire interior surface. Feed water heaters,

economizers, and compounds all help, but where the water is extremely bad, nothing but actual mechanical cleaning can be relied on in the long run.

NORTHWESTERN ELECTRICAL ASSOCIATION MEETING.

The Northwestern Electrical Association convenes at the Leland Hotel, Chicago, for a three day's session, beginning July 17. The local committee of arrangements, consisting of S. F. B. Morse, A. C. Bunce, John Valentine, Charles E. Gregory and James Wolff, has obtained the entire second floor of the Leland Hotel for the use of the association. Exhibits will be shown in the parlors. On Wednesday the association will visit the Harrison street power house of the Chicago Edison Company and also inspect the Metropolitan Elevated Railroad. On Thursday a special train will take members on a tour of inspection over the drainage canal. Friday will wind up with a drive over the boulevards and a visit to the World's Fair grounds. Business meetings will be held each day from 9 to 12. Among the papers to be read are: "The Choice of Transformers, by Prof. D. C. Jackson, of the University of Wisconsin, and "Boiler Feed Waters—Their Treatment," by Willis D. Jameson. The others have not been announced. The meeting will no doubt be well attended and full of interest.

ATTORNEY'S CONTRACTS DON'T GO.

Street railways can settle claims independently of claimant's attorneys, and have the settlement stand. Attorneys Waters & Douthart had charge of the interests of John Kuby, who was injured by a car of the North Chicago Street Railroad Company. Kuby settled with the company direct for \$1,000 and dismissed his suit. The attorneys had the suit reinstated on the ground that Kuby had assigned his claim for damages to them. The case was tried, and in his charge to the jury Judge Chetlain said, that if the evidence showed that Kuby had assigned his claim to the lawyers on the understanding that his suit was to be maintained by them, they paying the fees and expenses, then the agreement between him and the lawyers was illegal and the lawyers could not recover anything from the company on account of the assignment of the suit.

BROCKTON AND BOSTON CONNECTED.

By the completion of the short line between Quincy and Braintree, Mass., the large street railway centers of Boston and Brockton are united by an interurban electric line 40 miles in length. The fare for the distance is 35 cents, and the time 1 hour and 40 minutes, which will be reduced when some details are perfected. The ride promises to become very popular with pleasure seekers to whom it offers fresh air, cool breezes, a fascinating glimpse of the country, and the attractions of many suburban towns.

IRON CLAD CARS.

BY J. W. GREER, SECRETARY AND GENERAL MANAGER YOAKUM, TEXAS, IMPROVEMENT COMPANY.

Every since street cars have been used trouble has been experienced by reason of the panels cracking. This trouble is not confined to any particular make or class of cars but sooner or later develops to a greater or less degree in all.

It is not only an eyesore and source of annoyance to the manager who takes a pride in the appearance of his rolling stock, to see a hideous gap open up in the side or end panels of a car just received from his pet maker, or one which at considerable expense he has recently had repaneled and painted, but he also realizes that it means the entrance of water to the frame work and the speedy destruction of the whole car unless checked, and the checking simply amounts in many instances to a repetition of repaneling and re-cracking.

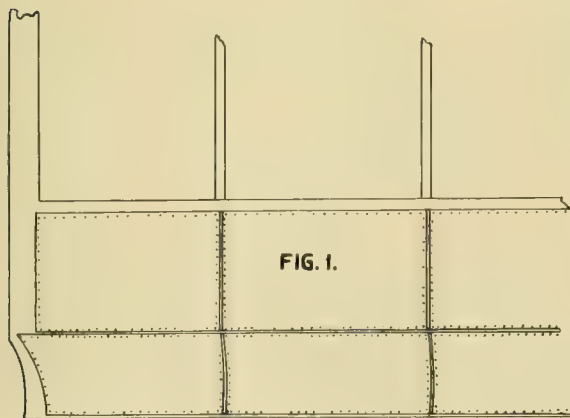


FIG. 1.

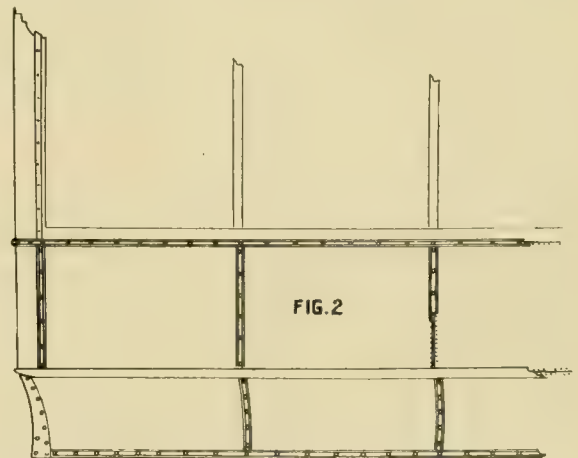


FIG. 2.

DIAGRAM IRON CLAD CARS.

I take it that it is not necessary to enter into the various causes of the trouble, but will simply remark that the advent of mechanical traction has greatly increased it, due to the greater strain at curves on the whole frame work of cars on account of their increased length, weight, and longer wheel base, coupled with increased speed and consequently greater striking power when "hitting the curve."

The remedy which the writer invented (but made no attempt to patent) in the days when he was a journeyman, and which is being used successfully by the various roads with which he has been connected during the several stages of his evolution towards "the office," is described as follows:

Remove the mouldings, irons and water drips from the car to be repaneled, and then instead of taking off the wooden panel leave it just as it is.

Take No. 20 charcoal sheet iron, smooth finished, and cut with tinnern snips into sections just long enough to cover the space from center to center of adjoining pillars, and wide enough to reach from the center of the moulding on the sash rail to the center of the water drip.

Punch holes with sharp pointed punch and a hammer, at intervals of three-fourths of an inch and one-eighth from the edge. Slush the wooden panel and the inside of the iron one with a heavy coat of scraps or mineral paint mixed with japan.

Nail the iron panel down with No. 10 wire tacks. These tacks have a broad, thin, flat head, will not break or pull out, and penetrate through the wooden panel into the frame beneath.

If the work is properly done the iron panel will be perfectly smooth and fit the wooden one air tight.

Fig. 1. shows a section of the side of a closed car with the iron panels nailed on ready for the mouldings. It will be observed that the edges of the iron panels are separated just enough to let the screws which hold the mouldings pass between them.

The water drip hides the tacks at the belt rail and the half round iron moulding covers those at the sash rail.

Some builders strap the panels at each pillar with band iron and this may be used to hide the tacks at the vertical

joints. Where the panels were not originally strapped, use seven-eighths inch beveled edge iron, one-eighth thick, drilled for No. 10 screws every two inches. Before the mouldings, irons, and drip are replaced the iron panels must be thoroughly primed twice with a mixture of lamp black and white lead thinned with japan gold size.

All colors used on iron must be ground in japan (except the white lead) and should be used flat. For primers, rough stuff, and putty should be mixed with japan gold size and no oil used.

Iron panels painted in this way will never scale, turtle shell, or blister, in fact it is hard work even to burn the paint off with a torch. Before screwing on the mouldings, iron and drip, coat the side which comes against the panel with a paste of white lead and whiting mixed with japan gold size and thick enough to make a water tight joint. Screw the mouldings on with No. 10 flat head screws, countersunk even, and long enough to penetrate through the wooden panel and into the frame. After the cars are painted it is impossible to tell from outward appearance an iron clad from a wooden paneled car, free from cracks. The object of cutting the panels

in sections is to overcome contraction and expansion, and also to facilitate repairs should such ever become necessary. If by some extraordinary accident a hole should be knocked through one of the sheets it is only necessary to remove the one damaged, entailing but little work or expense. The great number of tacks used is for the double purpose of preventing contraction and expansion and bracing the frame work. It will be seen at a glance that it is impossible for a joint to work after a car has been sheeted with iron as described, as every piece of the main skeleton is bound together and braced by the iron panels.

Fig. 2 shows the section of a closed car after the mouldings, irons, and water drip have been screwed on, with a section of each cut away to show the covered joints and tacks. Once in the life time of a car is all that it is necessary to sheet it with iron, and the life of a car is much prolonged by the operation. The painter should remember that the paints as mixed for the iron work, will be unfit for the woodwork which is exposed, and prepare the mixtures separately for the different purposes. It will be found advantageous by those who will take the trouble to try it (not only on iron clad cars but wooden panels as well) to have all striping, gilding and ornamentation done directly on the flat color, and all the varnish both rubbing and finishing put over it.

As the varnish is put on to protect the paint, it follows that if the ornaments, striping and gilding are put on the rubbing varnish they crack and peel off before the paint itself is affected, and give a ragged aspect to a car which does not otherwise need painting. The usual practice is to put these things on the color and varnish coat, after it is rubbed, or on the first coat of rubbing varnish.

Of course no color varnish coat is used in the method above. This digression has nothing to do with the subject but is thrown out as a hint for money saving in the paint shop.

To return to the subject, briefly, the advantages of iron clad cars are as follows, viz.:

The panels are cheaper and easier to put on than wood.

They do not crack, and look well as long as the frame lasts.

The repairs on car bodies are reduced to a minimum.

The life of the car is greatly lengthened.

The pay roll in the shops is wonderfully reduced.

The only disadvantage is an increase of weight equal to about 400 pounds to a sixteen foot closed car. My reason for going so minutely into details is that those wishing to try the iron clads may at once meet with success, without the numerous experiments which led up to the method described. When the member from "way-back" rises to enquire "what becomes of the contraction and expansion?" we will simply have to reply that it has gone the same way as that of the old fashioned expansion joint in track construction.

The Reliable Manufacturing Company, of Boston, Mass., is in the hands of the sheriff. A meeting of creditors will be held July 19, to choose an assignee.

CAN'T CARRY FREIGHT.

Street railways cannot carry freight in California unless their charters give authority, and if so they come under the jurisdiction of the Board of Railroad Commissioners.

To the question: "Do the various provisions of the constitution and laws of this state conferring powers upon the board, authorize the exercise of such powers over electric and motor railroads (other than street railroads within towns and municipalities) engaged in the transportation of freight and passengers within the State?" The attorney-general has replied:

"I am of the opinion that 'street railroads' within the meaning and intendment of the exception to the definition of 'transportation companies' found in Section 14, Subdivision 1, of the 'Act to Organize and Define the Powers of the Board of Railroad Commissioners' (Statutes of 1880, p. 48), are such roads only as are used exclusively for the transportation of passengers.

"If the franchises of the 'electric and motor railroads' in question merely authorize them to operate as 'street railroads,' then, in assuming to act as 'transportation companies' in the carrying of passengers and freight, or freight only, they are unlawfully exercising their franchises (Code of Civil Procedure, Section 803); and if your board will furnish me with evidence of that fact I will at once institute proceedings against them to forfeit their franchises, and at the same time to enjoin them from further operating their roads as carriers of freight. If, however, they are authorized by their charters to carry both passengers and freight, or freight alone, then they are 'transportation companies' as defined by the Act of 1880, and within the meaning of Section 22, Article XII, of the Constitution, and are subject to the jurisdiction of the Board of Railroad Commissioners."

TORONTO EARNINGS.

The Toronto Railway Company has just declared a semi-annual dividend of $1\frac{3}{4}$ per cent on the \$6,000,000 capital, which is equivalent to 35 per cent per annum on the original investment of \$600,000. This company was organized at Toronto, Ont., by H. A. Everett, C. L. Pack, E. W. Moore and others, of Cleveland, O., to take over the road from the city and operate under many restrictions, among which was a 3-cent fare for 2 hours in the morning and evening. The fare is 3 cents.

OPERATING EXPENSES AT SIOUX CITY.

The annual report of J. C. French, president of the Sioux City Traction Company, for the year ending May 31, 1895, has been laid before us. The cost of operating per car mile including maintenance of road and equipment, taxes, insurance, legal expenses, settlement of damage claims, vestibuling of closed motor cars and building of a snow sweeper, was 9.4 cents. The number of fares collected during the year was 1,511,760 and the amount paid out in settlement of damage claims \$254.59.

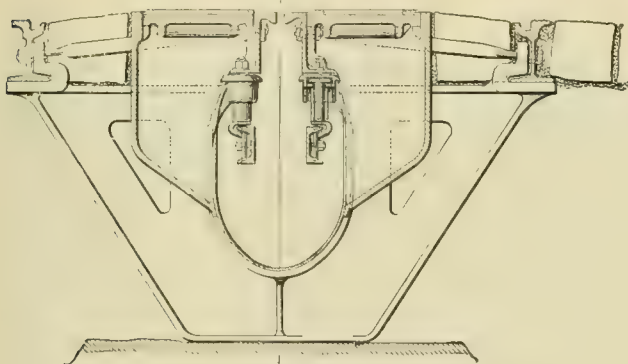
THE LENOX AVENUE CONDUIT ROAD, NEW YORK.

The first practical electric underground conduit railway in this country, built by an electrical manufacturing company is now in operation, and will shortly be run as an extension of the great cable system of the Metropolitan Traction Company.

The underground electric system employed differs radically from all other previously tried systems of electric underground conduit railways, both as regards the construction of the conduit itself and the method of taking the current from the conductors for the motors. It has been operated more or less experimentally for the last month, and its success so far has justified the sanguine predictions of the electricians and engineers who effected the installation.

As has been well known the Metropolitan Traction Company has been trying for some time to find a system which would be a good substitute for the trolley on the lines of light traffic and which would not prove objectionable to the ultra-conservative New Yorkers. After carefully looking over the field the company selected the plans offered by the General Electric Company, as offering the most advantages and being the most likely to prove successful. The long stretch of road on Lenox avenue was chosen as the scene of the experiment.

In formulating the project the Traction Company proceeded upon the most conservative lines, and deter-

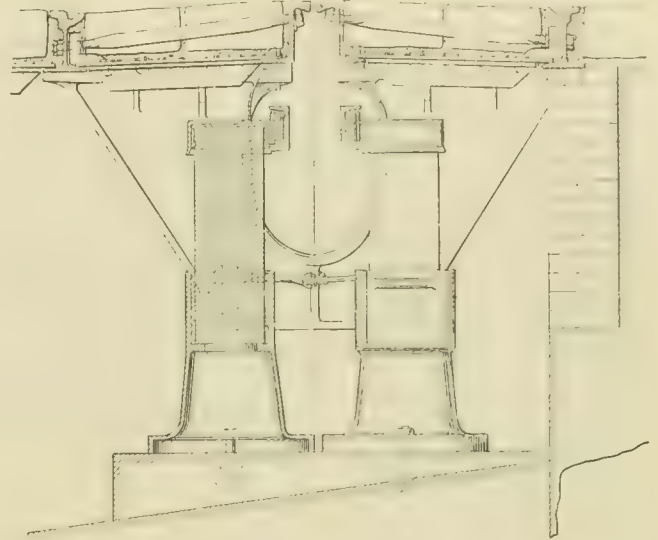


SECTION OF CONDUIT—INSULATOR SUSPENSION.

mined to reduce the consequences of failure to the minimum of damage which would inevitably arise from any stoppage in the service. The plan therefore contemplated the construction of the line as if for a cable road, in order that, should the electrical system prove unsuccessful, the electrical portion could be taken out and the cables and pulleys of a regular cable system introduced into the conduit without loss of time and at comparatively small expense. Upon this basis construction was commenced and no pains or expense have been omitted to render the installation and operation successful. The Lenox avenue line is a double track road, starting at the car house at 146th street and running directly south to 116th street, into which it turns and proceeds as far west as Manhattan avenue. It turns here and runs as far south as 108th street, along which it is laid to the junction of that street

and Columbus avenue. The district which this line will serve is at present somewhat sparsely settled, but the facilities of transit which it will afford will probably result in the rapid development of a new residence section.

The power house is a temporary frame structure with a sheathing of corrugated sheet iron, located on



SECTION OF CONDUIT—PEDESTAL SUPPORT.

146th street a few yards west of Lenox avenue. The present power plant consists of two 650-horse-power engines and two 400 kilowatt generators. Steam is supplied from 2 Babcock & Wilcox water tube boilers, arranged in one battery. Each has a rated capacity of 250-horse-power, furnishing steam at 120 pounds. The engines are horizontal cross-compound Allis-Corliss machines, which during the experimental trips will run non-condensing. All the steam piping is placed beneath the floor of the engine room. To each of the engines is coupled a General Electric 400 kilowatt generator of standard construction but wound for 350 volts, instead of 500 volts. This machine is placed between the high and low pressure sides of the engines. From the generators the cables run beneath the switch-board to a subway under the sidewalk on 146th street extending as far as Lenox avenue. Here they feed at present directly into the conduit, but eventually the conduit conductors will be sectioned and feed cables laid in the five-inch iron pipes which were laid parallel with the conduit.

The construction of the underground contact system is simplicity itself. The plough suspended from the car truck passes through the slot in the center of the track and presses against the flat surfaces of two iron conductors running the entire length of the conduit. These conductors are placed



PLOUGH OR UNDERGROUND CONTACT.

each three inches on each side away from the center of the slot to avoid deleterious effects of any drip which would otherwise reach them, and are of channel iron

ceiling of the conduit, the conductors are supported by a soapstone pillar. The channel bar conductors in this case are five inches deep and are set 12 inches below



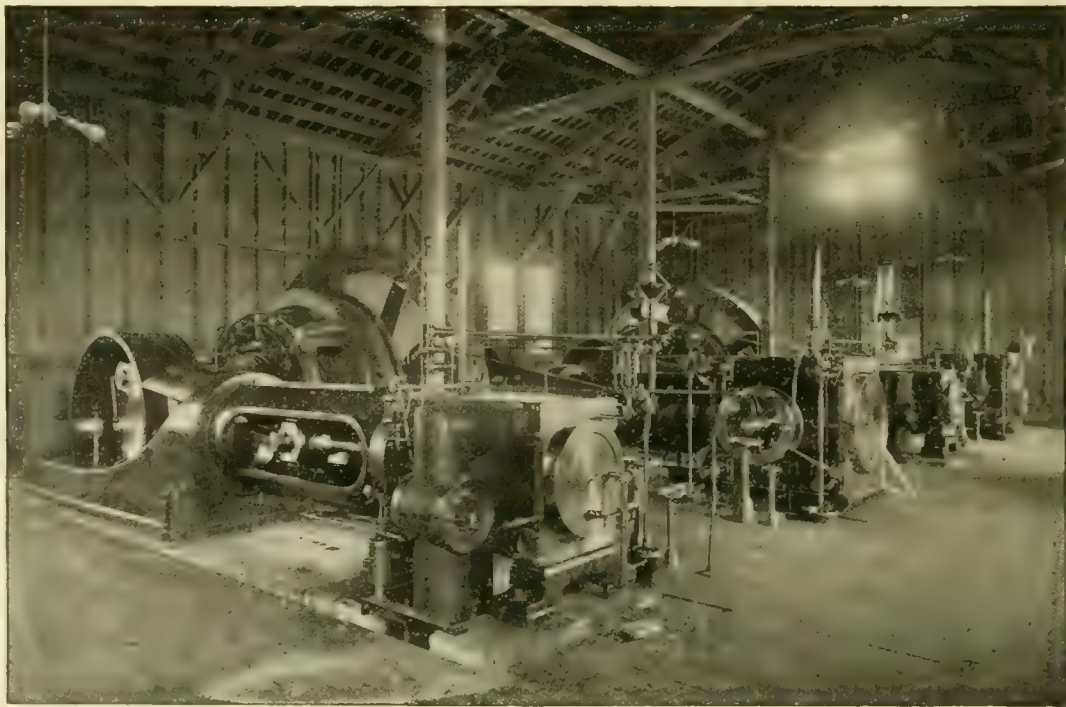
NEW YORK ELECTRICAL UNDERGROUND SYSTEM.—THE CAR.

four inches deep and thirty feet long. They are suspended from the ceiling of the conduit by means of insulators devised for this especial purpose, and are at a depth of thirteen inches below the conduit slot. Each conductor is sufficiently rigid to require suspension at the ends and centers only. The ends being located in the manholes and hand holes being placed at the centers, inspection and repair are rendered comparatively easy. The conductors are bonded to each other by stranded copper wire securely riveted into the web of the metal.

A modification of this system of suspension of the conductors is introduced for a length of about one hundred yards single track on 116th street between Lenox and 7th avenues. This is known as the pedestal method of support. At the manholes, instead of insulators suspended from the

the slot. The soapstone pillars are provided with iron caps furnished with brackets to which the conductors are bolted, and continuous connection is secured by means of a bond of flat copper strips riveted to the webs. The soapstone blocks are set in iron bases erected in the manholes. Every twelfth manhole is connected with the power house by telephone. Quick break switches are located at intervals in these manholes, in order that any section of the line may be cut out in case of trouble or accident. At the track switches each

conductor is provided with a flaring nose to facilitate the entrance of the plough into the conductors. The manholes in which the insulators are placed are 4 feet



INTERIOR OF POWER HOUSE.

4 inches in depth, 4 feet in length and 14 feet 5½ inches in width, that is, the entire distance of the two tracks. They are constructed of brick with 8-inch walls

that rest on concrete foundations. The floors are laid with 6 inches of concrete and are provided with drains for carrying off water. With this provision for drainage no trouble from water in the conduit will, it is believed, be experienced. The conduit was built along the grade of the street, but with sufficient pitch to permit any water flowing into the conduit to find its way into the manholes, located every thirty feet, and from thence into the sewers.

The current does not return by means of the rails. Each conductor forms one side of the working circuit, the current is fed into the positive conductor and returns over the other or negative conductor.

The plow or traveling contact arrangement is simple and novel. It consists of two pieces of iron, one on each side of the plow, supported on spring leaves which cause them to press outwardly against the two conductors. The plow is suspended from a longitudinal bar bolted to cross-beams set upon the truck and, is constructed of two sheets of steel laid each one upon a plate of fibre. The two sheets of fibre are then brought together enclosing strip copper conductors connected at the top to the motor cables, and at the bottom riveted to two other pieces of sheet steel. These run on each side of the plow and serve as supports for the hinges which carry the sliding contact pieces. A heavy sheet of fibre continues downward and serves to separate these contacts.

The motors employed are the standard General Electric 800, controlled by "K2" controllers. The cars which are to be used on the line were constructed by the John Stephenson Company and are mounted on standard cable trucks constructed by the Peckham Motor Truck and Wheel Company. They resemble those used on the Broadway line. The system has the best chances of success of any conduit yet constructed. The provisions for drainage are the most ample yet employed with a conduit. The construction is very simple and substantial and the voltage being only three-fifths of that on previous experiments there is a much reduced chance for leakage and grounds. If this experiment is not a success it will probably be the end of extensive conduit experiments in American cities. If it is a success there will probably be a moderate amount of such road built in places where a heavy traffic will warrant the expense. Such a road costs more than the cable to build and hence it cannot find a very extensive use. It will probably prove a blessing to New York where the need of rapid surface transit is only equaled by the opposition to the trolley.

RACE OF SELF PROPELLING CARRIAGES.

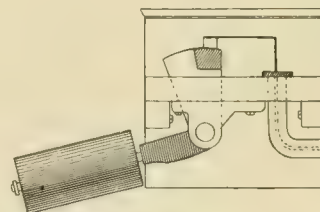
A race of 750 miles for horseless vehicles from Paris to Bordeaux and return, resulted in a victory for a petroleum carriage, which did the 750 miles in 48 hours, or at the rate of 15 miles an hour. All sorts of mechanically propelled carriages and bicycles were entered for the race. The petroleum bicycle which had a good start ran over a dog and was disabled.

STREET RAILWAY BENEFIT AT KALAMAZOO.

That the people of Kalamazoo appreciate their electric railway was shown by a demonstration which took place in that city at the second anniversary of the opening of the road on June 22. The day was made a general holiday in the city and nearly everyone turned out to the celebration. Special attractions were provided at the company's park from 10 o'clock in the morning until late at night. One of the features of the day was the giving away of 1,000 street car tickets. On certain hours each passenger on the way to the park was given a numbered slip. Duplicates of these slips were kept by the company, and at 4:30 and 10 p. m. two prominent citizens drew these numbers from a hat. Tickets to the amount of 500 were given at each drawing. The first fourteen drawn were the prize numbers, and the holders of the lucky numbers came forward at the time of the announcements to register their names and addresses. Tickets were distributed to them several days later. A great deal of interest and excitement was manifested by the crowd. It was a matter for the gratification of all that the prizes were drawn by those who could least afford to buy their own street car tickets, and the crowd broke into cheers, as the holders of some of the numbers came forward. In the afternoon, after an orchestra concert of an hour, several short addresses were made by prominent citizens in behalf of the town, and T. P. Bailey, president of the road, and assistant manager of the General Electric Company at Chicago, responded in behalf of the Citizens Street Railway and its owners, and quite distinguished himself as an orator. All the speeches and the general tone of the day's events showed, that there is the best of feeling toward the electric railway, at Kalamazoo, and the owners of the road are much to be congratulated.

BRIDGES CONDUIT AT SAN FRANCISCO.

A simple conduit system applicable to existing cable roads is on exhibition on the top floor of the History Building, in San Francisco. It is the invention of C. M. Bridges, of that city. The feed wires are run in iron or



BRIDGE'S CONDUIT.

terra cotta ducts between the tracks. At intervals of 30 feet in the conduit is placed a cut-out box, like that shown in the accompanying diagram. It has a roller projecting out at one side and this roller is connected to the feed tap only when it is raised by the passage of the long, flexible rod which runs underneath the car and makes contact with this roller. The rod under the car is long enough to make contact with two cut-out boxes at once. As long as the cut-out boxes are kept dry inside and the rod is kept from grounding and catching in the conduit the system is all right.



Interesting Bits of Information from all Parts of the Country,
Boiled Down for Busy Readers.

The cable car is full of progress. It can take no backward steps.

Philadelphia has passed an ordinance reducing speed of electric cars, at schoolhouses to six miles an hour.

It is said that one trestle on the new electric line between Niles and Youngstown, O., will be 600 feet long.

Hack and 'bus licenses in New Haven, Conn., have fallen off 30 and 50 per cent respectively, owing to electric competition.

The bill compelling the West End Street Railway Company, Boston, Mass., to give transfers, has died in the state senate. Requiescat in pace.

When the street railway mail cars are put in operation every breakdown of the cable will constitute an interference with the progress of United States mails.

Fenders make such a sweep outside the curve at one end of the City Railway, Dayton, O., that a danger line has been painted on the sidewalk as a warning.

Saloonkeepers in New Orleans, having been compelled to close Sundays, are trying to render odious the "blue laws" by having them enforced against Sunday cars.

The New Jersey Electric Railway Company has formally opened its line between Singac and Hoboken. A party of 250 representative people were handsomely entertained.

Coasting on streets containing a steam or electric railway or on any intersecting street within 200 feet is prohibited in Baltimore, by a recent ordinance under penalty of \$2 fine.

In order to create travel for a branch line that is not doing very well, the Detroit Citizens Street Railway Company has made a 2½ cent fare during the hours from 7 to 10 p. m.

Water power from the falls of the American River at Folsom, Cal., will operate the proposed Sacramento, Fair Oaks & Orange Vale Railway, a combined freight and passenger line 22 miles long.

It isn't often that accidents become revenue producers. A few weeks ago a car went through a bridge in Pennsylvania. Although nobody was seriously hurt, as soon as the news became known crowds of people rode out to the scene of the accident.

A Kingstown, N. Y., paper says: "A farmer who was in town to-day said he anticipated there would be a very dry summer, because the electric roads would take all the electricity out of the air."

The Birmingham Railway & Electric Company, Birmingham, Ala., has issued a neat folding time table for visitors and citizens, naming the points of interest on its three steam and three electric lines.

Rain is bad for the fenders with guy ropes which shrink so as to elevate the front above the level of a man's knee. Anyone struck by the overhanging contraption would probably be knocked under the wheels.

The Fitchburg & Leominster Street Railway Company, Fitchburg, Mass., sells a round trip ticket over its 15 miles of lines, good only on date of issue, for 25 cents. The holder has stop over privileges at four points.

The Springfield Street Railway Company, Springfield, Mass., will have only six-footers as conductors and motormen on its Holyoke line. Probably the reason is to increase travel on the part of young lady students.

Stockholders of the Menominee, Mich., Electric Light Railway & Power Company, were surprised at the annual meeting June 5 by a dividend, the first declared in ten years. It is needless to say that Manager Ed Daniell will be continued in office.

The railroad commissioners of California intend to assume jurisdiction over the electric interurbans of California outside of city limits if they are legally entitled to do so. The question has been left with the attorney general of the state for an opinion.

No more will the ponderous machinery in the cable driving plants of the Philadelphia Traction Company shake the ground and mimic thunder. That light-fingered sprite, electricity, has stolen its occupation, and now is heard only the whiz of the commutator and the flap of the flying belt.

Several persons were injured in a wreck of a car on the Dartmouth & Westport Electric Railroad at New Bedford, Mass., which was caused by the breaking of a wheel. The car jumped the track and broke a section of a stone wall. The motorman stood at his post and reversed the current.

One of the new Pennsylvania roads has got even with an injunction conspirator. George H. Perrigo visited property owners and secured their signatures to an agreement to sue for damages on account of running cars over private property. He secured 300 signatures and agreed to sell his list to a detective for the company for \$400. He was paid \$35 on account, and when he came to receive the remainder was placed under arrest for conspiracy. He said he was employed by lawyers.

GRADE CROSSINGS ON THE ASHLAND AND CATLETTSBURG STREET RAILWAY.

BY H. WELLMAN, SUPERINTENDENT.

I read with much interest the articles in the March and April issues of the REVIEW concerning grade crossings of electric lines over tracks of steam roads, and especially the short notice introducing the letter of Mr. Clemens, of Andover, Mass., on page 233 of your April issue. In it you state that street railways always get the worst of it in case of grade crossings, and also state that all safety appliances must be put in by the street railway companies while the steam road goes along as though no crossings were in existence.

I can happily say that our experience and condition of using a grade crossing are just the reverse of the above statements, although only after a tiresome and expensive litigation extending over many months.

it with electric power was begun in August, 1892. It was necessary to cross the tracks of the Chesapeake & Ohio Railroad at 37th street in Ashland, and at West Catlettsburg. This was bitterly opposed by the Chesapeake & Ohio officials. An order was placed for a standard crossing to be placed at 37th street, but before it was received the Chesapeake & Ohio Company secured an injunction from the county courts restraining the putting in or placing of it. However, on trial the injunction was dismissed, but at the same time gave Chesapeake & Ohio attorneys some twenty or thirty days in which to get a reinstatement in the State Court of Appeals at Frankfort, Ky. This was promptly and successfully done and was very discouraging to President Ringo, of the street railway company. He at once proceeded to employ competent counsel at the capital city to look after the interest of the road, and, if possible, defeat the purpose and designs of the railroad people. The matter apparently rested for awhile pending the legal proceed-



CROSSING AT THIRTY-SEVENTH STREET BEFORE AND AFTER LAWSUIT.

Our road was organized in 1890 under the name of the Ashland & Catlettsburg Street Railway Company, with A. C. Campbell, of Ashland, as president. In 1891 the Ashland Improvement Company secured controlling interest in the road, and Mr. Campbell was succeeded as president by Willis L. Ringo, ex-Secretary of State, Frankfort, Ky. Almost immediately after assuming the management of the road President Ringo made application to the Boyd County commissioners for a right-of-way over the county road between Ashland and Catlettsburg on which to build an electric line. The application was debated by the commissioners for several meetings, and finally, in February, 1892, was brought forward for a final decision. The vote by the commissioners ended in a tie. The county judge, M. H. Houston, settled the affair by voting in favor of the application of the street railway company, and giving it unlimited franchise over the county road between Ashland and South Catlettsburg, a distance of seven miles. The work of extending the old road to Catlettsburg and equipping

ings, and was finally brought to a climax by the street railroad company's attorney advising that the crossing be placed, in defiance of the injunction. They argued that through errors made by the Chesapeake & Ohio attorneys in their application for reinstatement of injunction we would be entitled to put in the crossing and use it. This was done at midnight on the 9th of May, 1893. After being in use some seven weeks it was ordered taken up by the judges of the Court of Appeals, and the steam road rails replaced. This was done on July 1. Cars were afterward run on each end of our road with the additional trouble of building another car barn and the transferring of all passengers at the disputed point. An injunction was also secured by the Chesapeake & Ohio attorneys against the placing of a grade crossing at West Catlettsburg. A tedious struggle in the courts was now begun, and was vigorously prosecuted by both companies. The result was that in June, 1894, a decision was finally announced in favor of the street railway company. A compromise effected

(after this decision) between the officials of the two railway companies, probably prevented the case being carried to the United States Supreme Court. The agreements of the companies were, to-wit:

That the street railway company accept an underground crossing at 37th street in Ashland and cross at grade the tracks of the Chesapeake & Ohio Company at West Catlettsburg which also best suited the topography of the country along the route of the road. The underground crossing was to be built entirely at the expense of the Chesapeake & Ohio Company, and also they were



GRADE CROSSING WEST CATLETTSBURG.

to provide all necessary safety appliances at the grade crossing at West Catlettsburg. The terms of the compromise as outlined, were carried out to the letter by the Chesapeake & Ohio Company, which constructed an underground crossing at 37th street for the street railway company as also the city street, having a width of 40 feet with a clearance of 14 feet 6 inches between our trolley wire and track. A double track steel plate bridge was placed over the underground crossing for the accommodation of the Chesapeake & Ohio trains. The total expense of the underground crossing was about \$18,000, which was borne entirely by the Chesapeake & Ohio Company. In addition to this, they placed entirely at their own expense at the grade crossing at West Catlettsburg a system of signals, derailing switches and a switch house in which are placed the levers used for setting the signals and moving the derailing switch points. The expense of the entire signaling devices at West Catlettsburg was in the neighborhood of \$1,200. The expense of maintaining a watchman at this switch house for eighteen hours per day is paid for entirely by the Chesapeake & Ohio Company. All trains run under control when inside the block which extends about 1,300 feet on each side of crossing and the engineers have strict orders to notice and obey all signals as set by the watchman which would bring them to a stop 300 feet from the crossing in case a car should be going over or become derailed while on the steam road tracks. I think you will quite agree with me when I say our road is an exception to your opinions regarding crossings as evinced by the remarks made in your issue of April 15. The defeat

of the steam road was due entirely to the tireless and unceasing energy of President Ringo, assisted by his corps of able attorneys at Frankfort, Ky. For the benefit of your correspondent W. C. Clemens and others, I will give a brief description of the signals and switches used at grade crossings at West Catlettsburg.

I also call your attention to a peculiar case of magnetization prevalent over the system. There are four steam signals each 30 feet high, and two dwarf signals and derailing switch points placed in our tracks, one on each side of crossings. The 30 foot signals are placed two on each side of crossing, viz.: the red or danger signals at a distance of 250 feet away, while the green or caution signals are each located 1,300 feet respectively from the crossing. One lever operates the two dwarf signals and the two derailing switch points. One lever handles the two danger or red signals while the caution or green signals, being at a greater distance from the crossing, are each operated by a separate lever. This makes four levers in all that have to be thrown each time a car crosses the steam road tracks. These levers are interlocking in such a manner that the distant signals (caution) are set first. Next comes the danger or red signals, and lastly the setting of dwarf signals and moving of derailing switch points, thereby opening up a clear path for the street car over crossing. As they will only work in rotation in the above manner, it will be seen that it is impossible for a car to cross the tracks until after all signals are first placed or set, thereby notifying engineers of approaching trains of the use of crossing by the street car, and they govern themselves accordingly. The levers in the switch house extend four feet above the floor and the same distance below. They are magnetized continually, but not at the same degree of intensity, being strongest morning and evening. The upper ends indicate a north polarity, while the lower ends are of south polarity. The levers are supported by a heavy cast iron floor plate and frame through which they extend. The phenomena have been attributed to idle or waste currents, although such a conclusion seems hardly probable, considering the excellent facilities enjoyed by the road for conveying the return current to the power house in Ashland, a distance of five miles from crossing. The road parallels the Ohio river the entire distance between Ashland and Catlettsburg. There are heavy ground plates or castings placed in the bed of the river and below the low water line at each end of road, one being placed at the power house while the other is near the crossing. There are also three ground plates sunk in the bed of creeks or branches, emptying into the river at about equidistant points along the road. All these ground plates are connected to the tracks by a No. 0 copper wire. In addition each joint of track is bonded by two No. 4 copper bonds with cross connections every 60 feet. The electrical part of the block system consists of batteries, relays, etc., which lock automatically, the lever throwing the derailing switch points, after a train has entered the block 1,300 feet distant and preventing the street car from going on the crossing

until after the train has passed. The entire apparatus has worked to perfection since first installed, and is probably the most safe manner in which a grade crossing can be used.

TEXTS ON TRANSFERS.

Not long ago it was reported that the Glasgow Corporation Tramway committee, had entered into a three years contract with certain gentlemen, to print texts of scripture on the backs of transfer tickets, the same as advertisements. We do not know whether it is an attempt to compel the citizens to unconsciously absorb scriptural truth, or for some other purpose. There are texts that can be made to refer to certain phases of street railway practice.

For instance, if a car is delayed in coming to a transfer point, the conductor might give his passenger a ticket with this text, Ezek. 10: 6, "Took fire from between the wheels." The conductor who collected the transfer would immediately discover the cause of the delay without asking questions.

When a car is loaded with passengers, instead of giving two bells, the conductor could pass up to the motorman a card marked II K. 4:24. The motorman would act accordingly, for the text reads: "Slack not thy riding, except I bid."

Where the people prefer to use their horses and carriages to riding on the cars, the management could get out a transfer on stormy days with Zech. 10:5. "The riders on horses shall be confounded." This might remind them that the street railway company was doing business on pleasant days, as well as in the storm, and was deserving of patronage.

If the company has a new car for parties, it might run on its transfers Jer. 18:3. "Behold he wrought a work on wheels." Then could be run a cut of the new car and the schedule of prices.

The West End Company, of Boston, might print on its transfers a few days before the new subway will be opened, "He shall be driven from light into dark." Job. 18:18. The West End will find the subway to be for a while as good as a summer resort for increasing traffic.

In cities where the passengers are not as plentiful as they should be, the company might advertise at the church doors, Dan. 4:37. "They that walk in pride, he is able to abase." Or, for late comers to church, I Sam. 25:42. "And Abigail hasted and rose and rode."

The Seattle Consolidated could have used this form after its fire: "He burneth the chariot in the fire." Ps. 46:9.

The management of the street railway company, could have used this warning at Ottawa a week, or so before the line was abandoned: "I will cut off the chariot from Ephraim." Zech. 9:10.

If a company is about to adopt electric traction, it could notify the people by Nah. 2:8. "Chariots shall be with flaming torches," and "His chariots shall be as a whirlwind." Jer. 4:13.

The Chicago City Railway Company, might have run an edition of its transfers after the incident with the Chicago General Company on Twenty-second street, with Gen. 46:29: "Joseph made ready his chariot and went;" and Ex. 14:25, "Took off their chariot wheels that they drave them heavily."

Still, if this practice became general, the public might retaliate by showing the conductors a card when there was a delay with these words: "Why is his chariot so long in coming." Judges. 5:28.

An old story is told of a clergyman who applied for a pass on a certain railroad and received the following answer: "Thou shalt not pass."—Numbers 20:18; "Suffer not a man to pass"—Judges 3:28; "None shall ever pass"—Isaiah 34:30; "This generation shall not pass"—Mark 30:13; "Though they roar, yet they cannot pass"—Jeremiah 5:22; "So they paid their fare and went"—Jonah 1:3.

TWO ROADS OPEN AT DETROIT.

True to his promise made November 28 last, when the franchise was granted, H. A. Everett began July 1 to run cars over the new Detroit Railway. The formal opening took place a week later with appropriate ceremonies. Twenty-two miles of line are in operation, and a great deal more is under construction.

On the same day the Rapid Railway Company opened its interurban line between Mt. Clemens and Leesville, where connection is made with the Detroit Citizens' Street Railroad. The distance is 16 miles and the speed 30 to 35 miles per hour. Steel 70-pound rails are laid on 2,640 ties to the mile. The motor cars are 33 feet long, vestibuled at both ends, and mounted on double trucks having 33-inch wheels. The cars resemble those of steam roads in their substantial build and were furnished by the Jackson & Sharp Company of Wilmington, Del.

EXCLUSIVE RIGHTS IN STREETS.

Judges Frazer, Lillibridge, and Donovan, of the Wayne county circuit court, have decided that the Detroit, Citizens Street Railway Company has no exclusive rights in streets. The question came up in an application for an injunction restraining the Detroit Railway from laying a third track on Michigan and Monroe avenues. The court said:

"The construction of the proposed railway by defendant for the purpose of constructing and completing its line, while it may work some injury to the complainant by way of diverting a portion of its business over defendant's railway, would be a great convenience to the people of the city, and even if the construction is to be put upon the statute claimed by complainant's counsel, it is not such an unreasonable impairment of its rights, in our opinion, as would authorize this court to interfere by injunction to stop it."

PRACTICAL IDEAS FROM ALABAMA.

J. B. McClary, superintendent of the Birmingham Railway and Electric Company, Birmingham, Ala., has put into practice several ideas that are of interest to other street railway men. The first illustration is a car used for advertising purposes. An ordinary motor car covered with bunting in which is a band or fife and drum corps is sent over the lines. This idea was conceived by



EARN \$5 A ROUND TRIP.

W. A. Halstead, of the Consolidated Street Railway Advertising Company. The street railway company charges the advertising company \$5 a round trip over the 15 miles of its electric road. The advertising company charges its patrons \$10. The car created considerable notice and has proved a drawing card to the advertisers.

The photograph in the upper right hand corner of the group is a 36-foot open car formerly run on the dummy line, equipped with four T.-H. F30 motors. These motors have been abandoned and G. E. 800 motors substituted. It is a very attractive car and is used for picnics and excursions. Being so much larger than any

other car the company has, it naturally attracts the attention of the children, who talk about it at home and beg to be allowed to ride in it.

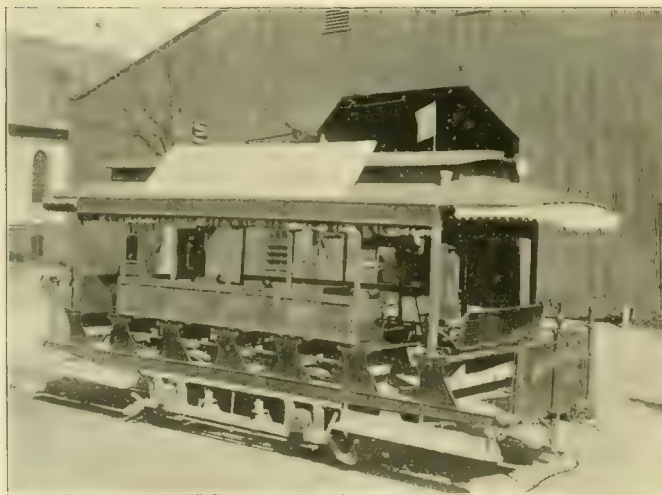
The other views are an exterior and interior of an old open horse car equipped with motors. A narrow aisle is left in the center, so that fare boxes may be used. Five of these cars are in service giving excellent results and they are very popular with the traveling public.

H. M. LITTELL IS LADEN WITH GIFTS.

The host of friends whom Mr. Littell made during his stay in New Orleans could not let him leave them without testifying their high appreciation. The day before his departure a committee of employees waited upon him and presented him with a little Russia leather covered volume containing a testimonial signed by about 450 of the employees, mostly motormen and conductors, stating that they had found him a kind and impartial manager, easy to approach with their grievances and prompt to apply the remedy, and expressing their good will to him and kind wishes for his future prosperity.

In the evening an informal banquet was tendered Mr. Littell by the directors of the company, who gave him a silver service, beautifully chased, in a case with suitable inscription. The tone of their remarks was highly complimentary to the retiring manager. The directors were proud of their road and gave Mr. Littell credit for its condition. At the company's pleasure resort, West End Park, the employees presented Manager Littell with a silver mounted inkstand and paper cutter and a magnificent solitaire diamond.

"Duncan's Manual" of British and foreign tramway companies and officers, contains the most reliable and complete directory of the kind published. It is issued once a year and the 1895 edition is at hand as good and complete as ever. T. J. Whiting & Sons, 7a South Place, London, E. C., are publishers, and will mail copies on receipt of one dollar.



TWO MADE-OVER CARS.

DANIEL F. LEWIS AND THE BROOKLYN CITY RAILROAD.

Origin of the Traction Consolidation.

Few street railway men have been more prominent or are as widely known by reputation as Daniel F. Lewis, for nine years president of the Brooklyn City Railroad and the head of the Lewis & Fowler Manufacturing Company.

The Brooklyn Eagle devotes several columns to a history of his life and street railway enterprises from which the following is extracted.

Mr. Lewis was born March 28, 1849, in Brooklyn, of French and Welsh descent. Leaving school at the age of 13, he spent four years in the office of his father who was then state treasurer. When the elder Lewis became secretary of the Brooklyn City Railway several years later, he began his street railway work in that office, becoming assistant secretary in 1880; treasurer in 1882; a director in 1883; and secretary and treasurer the following year. In 1886 occurred the resignation of president William H. Hazzard, growing out of what was then deemed a great extravagance—the expenditure of \$50,000 in a resort hotel and necessary track extensions thereto. The directors unsuccessfully offered the office to several men, and Mr. Lewis was put in the president's chair as purely a temporary arrangement, until some one could be chosen.

This was what Balzac calls the "psychological moment" of Mr. Lewis' life. He seized it and by his firm grasp showed that he was no ordinary man. The directors of the company had not the least idea of retaining him as president. He was not then in the same class with the men who had previously occupied that position in what was, even when but a small railroad, the largest corporation in Brooklyn. They were waiting until they could get a man of standing, of means and of wide reputation to fill that place. Mr. Lewis' task was to prove to these directors, without appearing to do so, that he fitted the place. In this he succeeded. He made himself indispensable. His long connection with the company, his railroad experience, his tenacity of purpose and his ability to inspire confidence kept him for nine years where he had been placed temporarily. He showed them how valuable a railroad man was at the head of a railroad company instead of a builder or banker. Some of them he interested financially in an enterprise at whose head he stood. This was the Lewis & Fowler Manufacturing company, a small affair at the time, and whose undulating history, since then, has resembled his in rapid prosperity and in still more rapid decline. Some of these directors bought stock in this concern. This association was extremely valuable to him in that part of his career.

As soon as Mr. Lewis found himself firmly settled in the president's chair he began to show that he was possessed of a comprehensive view of affairs and of ideas much broader than those which had hitherto prevailed

in local railroad circles. When he took hold of the Brooklyn City railroad its system comprised but 89½ miles of track. The cost of road and equipment was \$4,231,019. Its receipts during the first year of its management were \$2,431,849. It carried 50,700,000 passengers. Its capital stock was \$3,200,000 and its bonded debt \$800,000. Mr. Lewis saw that the bridge, which had only been opened for traffic for three years, and the elevated railroads, which were but small competitors at that time, were bound eventually to greatly increase the population and prosperity of Brooklyn. In this prosperity the Brooklyn City railroad, despite elevated railroad competition, must share. Its growth he decided would be greatly facilitated by extensions of its system. His conservative enthusiasm, although at first received coldly, eventually convinced his slow going board of directors. As a result, from 1888 to 1890 the Brooklyn City Railroad company purchased the capital stock and absorbed the charters and franchises of the following railroad companies: The Bushwick, the Crosstown, the Calvary Cemetery, Greenpoint and Brooklyn, the North Williamsburgh and Flatbush, the Greenpoint and Lorimer street, and the Grand street and Newtown companies. As the result of these acquisitions the capital stock of the company was increased to \$4,000,000 and then to \$6,000,000 and the bonded debt, including mortgages issued by the purchased companies and assumed by the Brooklyn City company, was raised to \$3,925,000. The receipts were increased to nearly \$4,000,000. The track mileage was lengthened to about 160 miles.

Having succeeded in obtaining control of every available railroad company in Brooklyn Mr. Lewis devoted his attention to the problem of suburban transit. The result was the Second avenue railroad, the extension of the Flatbush avenue line, the construction of new connecting roads in the Ridgewood section and the building of a steam road to Morris Park and the extension of that part of the system which is tributary to the Grand street and Greenpoint ferries.

In 1890 he set about the adoption of electricity, and in 1891 applied for franchises, which the council passed in December, but which mayor Chapin left unsigned on retiring in January. His successor, mayor Boody, vetoed the ordinance, but the council passed it over his head. It was the hardest trolley fight made in any city.

Late in 1891, after the trolley franchise had been practically assured to the company although not formally adopted, Mr. Lewis felt that the time had come for the greatest financial combination in the history of Brooklyn and for one of the greatest deals in the history of street railroads. He carefully matured his plans and after consulting with three of his closest confidants in the board of directors of the Brooklyn City Railroad Company, he asked for an interview with H. B. Hollins who posed as the genius of the Union ferry syndicate, and to whom its success was then ascribed. The result of that interview has been the Long Island Traction company with all its early hopes and later failures, with all its millions made and millions lost, with hundreds of men temporarily enriched and with

hundreds more impoverished. The result of that interview was elation, inflation and finally failure.

After several conferences between Mr. Lewis and Mr. Hollins, the latter proceeded to organize a syndicate for a raid on Brooklyn. He succeeded, and in the spring and early summer of 1892 began to buy Brooklyn City Railroad stock. Carefully keeping out of sight and acting through local brokers, all the stock in the market was quietly absorbed. The market price rose from 175 in May, 1892, to 225 in November, before the stockholders received any intimation that an attempt was being made to secure a controlling interest in the capitalization of the company. When the *Eagle* first made public the fact that such an attempt was being made, there was a still further increase, until, late in December, 1892, just prior to the increase in capital stock from \$6,000,000 to \$9,000,000, Brooklyn City Railroad stock sold at 310.

It was in the circumstances connected with this buying



DANIEL F. LEWIS.

movement that Mr. Lewis first began to make enemies in any considerable number. He had made what now turns out to have been a serious mistake. He knew positively the plans of the syndicate. He was, it is now believed, one of several men who had entered into a contract to deliver the control of the company over which he was president to the syndicate. He was appealed to on all sides by stockholders to give them some definite information. This he refused, and as a result two-thirds of the stock of the company changed hands. As was natural, every man who had sold his stock at any less figure than the top price felt a personal grievance against Mr. Lewis for withholding definite information. The enmities thus created have since had a powerful influence upon the company and upon him.

The traction scheme, as it was finally launched, possessed most brilliant possibilities. The trouble was that these were merely possibilities and not certainties.

Even before the traction stock was issued on July 1,

1893, the gales had begun. Early in May occurred the precursor of the most terrible monetary panic in history. In July this financial cyclone was in full swing, leaving ruin and devastation along its path. The Brooklyn City Railroad company was at that time in a peculiar position. It was in the midst of the work of substituting electricity for horses. It had made contracts amounting to about \$7,000,000, and had raised by the increase of the stock, only \$3,000,000. It was necessary for the company to raise the balance or, although perfectly solvent, to go into the hands of a receiver. Therefore, despite the panic, the directors determined to increase the capital stock from \$9,000,000 to \$12,000,000 on September 1, 1893, making the conditions of the issue as easy as possible. This action was severely criticised at the time. It precipitated a local panic. Stockholders found it impossible to pay for their allotments of the new stock and found it impossible to borrow money. The banks and trust companies refused to lend. This caused a wholesale selling of the "rights" to subscribe for the new stock, resulting in unparalleled depreciations in value. The stock already issued of course fell simultaneously, declining from 210 to 118. Traction stock which had sold at 46 in May broke to 14 in August. Those months will never be forgotten by men who were actively interested, at the time, in these local securities. One banking institution alone was compelled to call loans to the amount of \$2,000,000 in two days. Hundreds of families which had been living in comfort and in luxury found themselves in poverty.

Here is another cause for the growth of a feeling of animosity toward Mr. Lewis and his company. People who themselves were embarrassed and whose friends and relatives were ruined by that local panic, blamed him and his company. Just or unjust, this feeling was hardly unnatural.

The depression of business which followed the panic of the summer of 1893 had a most important bearing upon the Long Island Traction Company and upon Mr. Lewis, who had become its president, as well as president of the Brooklyn Heights, which was the leasing company. The semi-paralysis of industry caused such a decrease in the receipts of the system as had never before been known. Not only was the natural growth of the business checked, but for many months the number of passengers carried was less than that of the preceding year. This was most unfortunate, for the Traction plan, to achieve success, needed the full limit of its earnings. As each quarter came round it became more and more difficult to meet the rentals due to the Brooklyn City Railroad Company under the lease. Matters grew so bad that the dividend due on July 1, 1894, had to be technically defaulted by the Brooklyn Heights.

The latter company has been in more or less trouble since the previous May. The causes of its embarrassment are as follows: The contracts for electrifying the system had, many of them, been made when the prices of electric supplies were very high. This precipitancy Mr. Lewis has since explained by saying that the public

feeling against the trolley was very intense and that it was possible that the common council might be induced to rescind the franchise. This made rapidity more essential than economy. At least \$2,000,000 was spent by the company in placing Lewis & Fowler girder rails. This rail was manufactured by a company of which Mr. Lewis was treasurer and in which he was largely interested.

The whole cost of electrifying the system, despite the fact that fifty miles of old rails still remain, has been at least \$14,000,000. The amount is fully double the original estimate made when the stockholders of the Brooklyn City Railroad Company were asked to authorize an increase in capital stock.

The Brooklyn City Railroad Company contributed to the cost of electrifying the system \$9,000,000 raised by the issue of bonds and stock. Under the lease any further expenditures were to be met by the leasing company, the amount of the expenditures being a credit in its favor, to be liquidated by the Brooklyn City Railroad Company at the expiration of the lease which, by the way, was made for the term of 999 years, or any sooner termination thereof. This condition was not fully comprehended by the directors of the Brooklyn Heights Railroad Company and of the Long Island Traction Company, consequently when the funds of the Brooklyn City Railroad were exhausted they raised, acting under Mr. Lewis' advice, \$1,750,000 on notes and from the earnings of the system, and paid out that amount toward the conversion and extension of the system.

In May, 1894, as has been said above, the directors of these two companies discovered that it would be impossible to raise any more money upon the credit of either company, and that the earnings of the system up to July 1 would not meet the rentals then due. They appealed to the directors of the Brooklyn City Railroad Company, asking that company to reimburse the Brooklyn Heights Company for the money which the latter had expended on the former's lines. This was refused and the provision of the lease above referred to was quoted as the reason.

Mr. Lewis found the companies over which he was president in a serious predicament. It was necessary to default in the payment of the Brooklyn City dividend in order to utilize \$250,000 of the \$4,000,000 guarantee fund, as it was provided for in the lease for just such an emergency. It then became necessary to raise money for the purpose of paying off the floating debt and of meeting claims which threatened to throw the Brooklyn Heights Company into the hands of a receiver. As a result, late in August, the famous collateral trust note plan was made public and a portion of these were issued on October 1, despite legal steps taken to prevent it by P. H. Flynn, president of the Nassau Electric Railroad. Mr. Flynn, in the spring of 1894, had brought suit to declare the lease of the Brooklyn City Railroad Company to the Brooklyn Heights Railroad Company null and void. He now brought suit to declare the collateral trust note issue illegal, and another suit asking the courts to compel the Brooklyn Heights Railroad to account for

the surplus of the Brooklyn City at the date of the delivery of the lease.

These collateral trust notes were a very unpopular issue to the stockholders of the Long Island Traction Company and were an important factor in discrediting Mr. Lewis.

In January of this year came the strike, which cost the company half a million dollars and made it impossible to meet the April rental. The consequences were the receivership in March, the reorganization committee, the Flower syndicate and the culmination of a long series of events when Mr. Lewis handed in his resignation as president of the Brooklyn Heights Railroad and of the Long Island Traction Company.

Mr. Lewis' personal fortune has shared the vicissitudes of the Traction Company. When he became president of the Brooklyn City Railroad Company in 1886 he was worth a few thousand dollars which were invested in the stock of that company and in the firm of Lewis & Fowler, which manufactured car registers for railroad cars. The good fortune which accidentally dropped him into the presidency of the railroad company and kept him there, followed him financially. His investments were fortunate. The money he made he put into various profitable enterprises, including real estate, Lewis & Fowler Manufacturing Company stock, which was the capitalization of the original little business; into United States projectile stock, into Lewis & Fowler Girder Rail Company stock, into the Knickerbocker Steamship Company, into E. W. Bliss Manufacturing stock and into other enterprises. Early in 1893, prior to the panic and when Traction and Brooklyn City Railroad stocks were very high, Mr. Lewis admitted that he was worth very nearly a million dollars. The decline in Traction and in Brooklyn City Railroad stocks, the absolute failure of the Lewis & Fowler Manufacturing Company, the declines in Lewis & Fowler Girder Rail, in Knickerbocker Steamship, in Bliss and in Projectile stocks have affected Mr. Lewis' fortune very seriously.

Mr. Lewis is 46 years of age. His constitution is unbroken. That he has courage in the face of adverse circumstances and the tact to seize favorable circumstances he has amply proven. With such a man, in this era and in this country, it is not hard to predict great achievements by him in the future.

WASHBURN & MOEN FACTORY ON THE PACIFIC.

The Washburn & Moen Company has added to its already extensive equipment of factories by acquiring the plant of the California Wire Works at San Francisco. This enables it to accommodate its Pacific coast customers better than before, while the machinery and skilled workmen of the California Wire Works are a valuable addition to the resources of the company. The company already has, it will be remembered, its works at Worcester, Mass., and at Waukegan, Ill. Frank L. Brown is agent for the Pacific coast and the San Francisco offices are 8 and 10 Pine street.

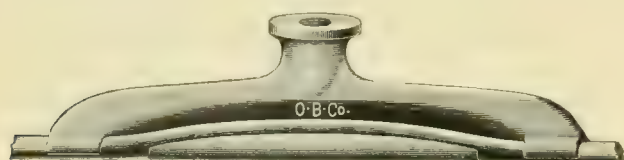
THE INSOLENCE OF OFFICE.

La Fayette has had an example of the "insolence of office" that should have been severely punished. George W. Brown, superintendent of police, was riding on a car, and as it passed his house without stopping, he jumped up to pull the strap, but instead of ringing the bell, rang up a fare. The conductor, who, not being a criminal, was unacquainted with the august official, demanded a nickle for the fare that was rung up, politely explaining that it would come out of his pocket. Supt. Brown refused to pay, as it would be a punishment to the conductor, which would cause him to remember to stop the next time the superintendent of police was on the car. The conductor told him he was a new man on the road, did not know where Mr. Brown lived, and that the latter did not signal for the car to stop. Later in the day, as the conductor was passing the courthouse on his car, he was dragged from his post by the superintendent of police who detained him half an hour while he lectured him and attempted to make him apologize, which the conductor rightly refused to do.

We would like to know what there is about the personality of a chief of police, that entitles him to tie up a street railway for half an hour. We would also like to know how he expects a conductor, or any other person to know what is going on in his mind, if he has one, which is doubtful from this incident, unless he gives some outward sign. Why should a public officer have any more rights on a street car than a private citizen? The chief of police is supposed to preserve the peace, instead of inciting and abetting infractions. It looks as if the company had a good case for damages, although circumstances might prevent the collection of a judgment.

WALKER TROLLEY EAR.

Among the numerous new devices listed in the railway supply catalog recently issued by the Ohio Brass Company, is the Walker trolley ear, used for some time at Sioux City. There is a prejudice among many constructing engineers against using anything but a soldered ear, because the majority of mechanical clips offer enough



of an obstruction, so that the trolley wheel sparks in passing over them owing to a partially broken contact. This is also true to a slight extent with a soldered ear. In the Walker clip the trolley wire is bent up by the clip so that the trolley wheel has a perfectly straight level surface to travel over. That portion of the ear under which the wheel rolls is of the same diameter as the wire. The ear is made for both straight line and curve suspensions and is easily put up. A forming tool is advisable for bending the wire, although it is not absolutely necessary.

COULDN'T CHARGE FULL FARE.

A woman hurriedly ran along Cottage Grove avenue. She was making a mad attempt to reach a passing car. The conductor saw her, but evidently did not wish to delay any longer than was necessary to accommodate the people who were getting off. Just as the car was moving south the woman jumped on. "I should think you'd have sense enough not to want to kill people," she snapped at him. The conductor answered politely: "Well, madam, our train is late and there's another just behind this that would have waited for you." "It's your business to wait for any one who hails you, whether you're on time or not," she replied in a high temper. With frowning brow and flushed face she left the platform. Then she began to talk in a loud voice about the street railway company and what a shame it was that they employed persons who delighted in being rude to women. Presently the conductor came in to collect her fare. She handed him a 10-cent piece. "I can't take that because it is Canadian money," he said quietly. "Well, I got it on the street car." "I'm very sorry, but it's against orders for us to take any money not coined in the United States." She darted a furious look at him as she handed him five pennies. "I hope you won't find any fault with those," she said ill-temperedly. He looked at the pennies and then deliberately gave her back two of them. "What are these for?" she demanded. "Well, I thought you were acting like a 4-year-old, and so I didn't think that I had any right to charge you full fare," the patient man replied.

PHOTOGRAPHING EMPLOYEES.

Several original methods have already been introduced in connection with the management of the Detroit Railway, and it begins to look as if the city of the straits was to be an ocean of new ideas in street railway methods. The rivalry of the two companies is not confined to right of way contentions, but extends to the operating departments, each of which is endeavoring to outdo the other in economy of administration, and the maintenance of a model road.

It is the desire of S. R. Break, superintendent of the Detroit Railway, to know personally every employe. On this account each applicant for a position comes before him for examination. Only applicants who have had experience are being examined at present. Most of them are in the employ of other companies, but expect to secure easier runs with the new company. The main requirement of conductors is that they shall treat the public with respect. Motormen are examined as to their knowledge of motors, and an effort is made to discern if they are cool headed or excitable.

Each successful applicant must furnish a photograph, which will be put in the employe's gallery. These likenesses the superintendent will study until he becomes familiar with each employe. Aside from this feature,

there are other points in favor of a photograph gallery, which will become more valuable every year. The chief one, perhaps, is that it will be a good bureau of identification, which will be always ready for consultation.

VESTIBULE EQUIPMENT.

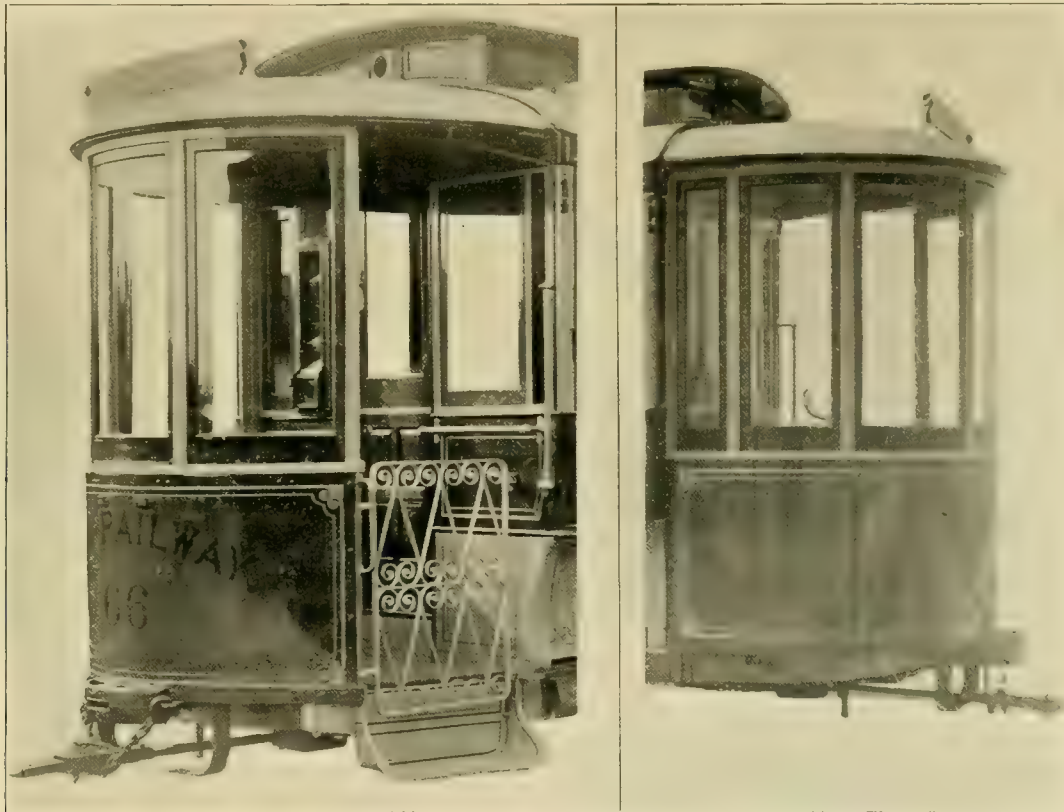
PART II.

In the June REVIEW was printed several opinions of managers on the subject of vestibule equipment, which have attracted wide interest. In this issue the discussion of the question is continued, most of the opinions being

favorable in severe weather. The motorman being fully inclosed is warm and comfortable and in much better condition to handle his car properly and safely than though he was benumbed with the cold. This is quite a point in the accident feature of the business."

BELIEVES IN THEM.

J. E. Rugg, superintendent of the Citizen's Traction Company, Pittsburg, writes: "We use vestibules on all our cars, cable and electric, and believe most thoroughly in them. The advantage is that they protect the gripmen and motormen in cold and stormy weather, so that they are able to be comfortable without encumbering



BARNEY & SMITH VESTIBULE.

favorable to providing the cars with vestibules on one end, leaving one side partially open.

G. H. Campbell, manager of the Winnipeg Electric Street Railway Company, Winnipeg, Man., writes: "We use vestibules on all our cars. We have to as our winters are cold. There is no city ordinance, but a heavenly one."

A manager of a large system writes: "All motor cars operated between the 1st of November and the 1st of April, are equipped with vestibules. This was done in compliance with the law passed by the state legislature during the winter of 1892-3. It involved a good deal of expense for us to make these changes but there are some points wherein the vestibuled car has its decided advantages over an open front car. The body of the car is much warmer, being protected by the double partition, and consequently the passengers are much more com-

fortable with extra clothing and waterproofs. They can always be in full uniform in summer and winter in any kind of weather; and can perform their work with much less danger of taking cold. We do not believe that a motorman running his car at 12 or 15 miles per hour in the face of a driving rain or snow storm, or even a biting wind, can give proper heed to the company's interests as to safe running, without some such protection as the vestibule gives."

MR. MCLEAN FAVORS ONE VESTIBULE.

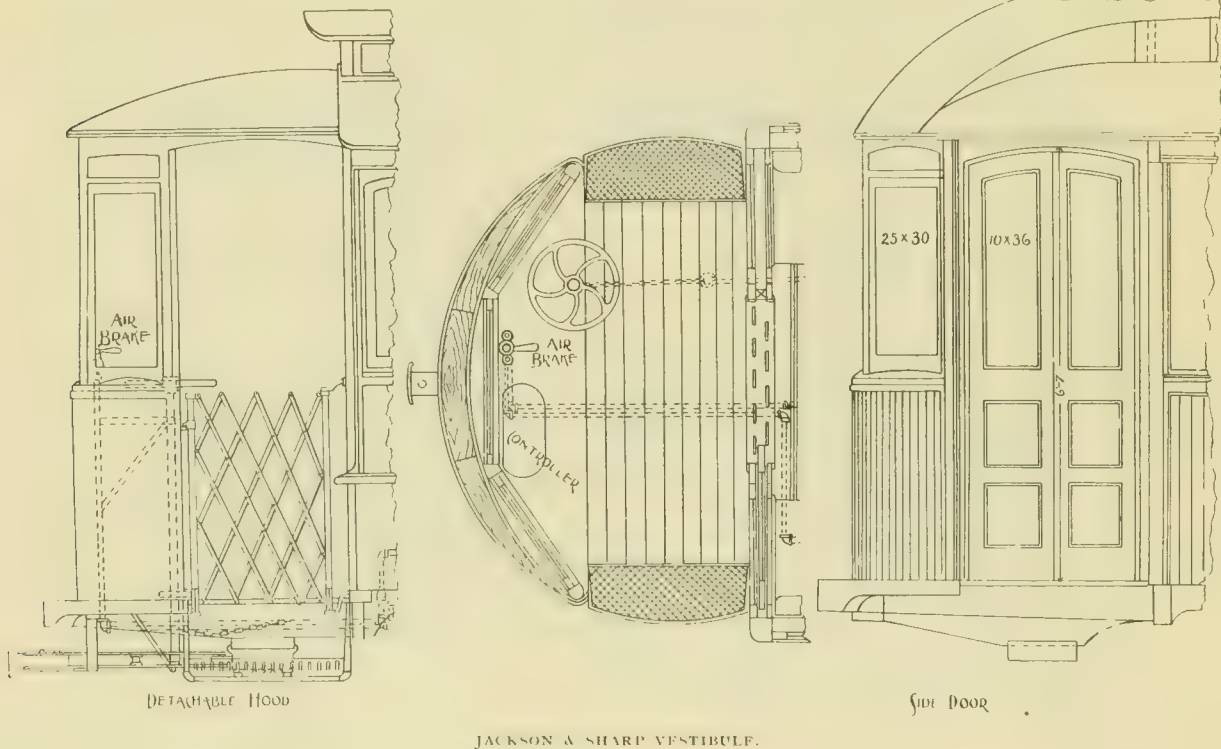
Thomas H. McLean, General Manager of the Citizens Street Railroad Company, Indianapolis, says: "We are operating 95 cars vestibuled on one end. During the past year we have vestibuled 20 cars of this number voluntarily. The Indiana legislature, at its last session, passed a law compelling street railroad companies in this

state to vestibule the motorman's end. We have anticipated this, as you see. In my judgment cars vestibuled on one end are an advantage, rather than a disadvantage. During the cold weather the men are not encumbered with surplus clothing; the diverter, controller, lighting arrester, fuse box and shunt coil are all protected from the elements; the motormen have no difficulty in throwing switches by means of long switch hooks, and we do not find that the operation of vestibule cars tends to increase the number of accidents. We have operated both styles of cars, and are able to state facts on this point. At our terminals we use either loops or Y's, and therefore vestibule one end only. We are opposed to vestibuling both ends, as we cannot carry as many passengers

winds and storms. We did not find that the cold and wet weather made it difficult for the men to see through the glass. We did not put on a perfectly tight vestibule, but left one side open. We think the vestibules are a protection to our passengers and they are especially beneficial to companies who have to heat their cars. It makes quite a saving in fuel, because every time the car doors are opened you do not have a direct blast of cold wind to blow all the heat out of the car."

THREE FAVORABLE VIEWS.

F. B. Musser, superintendent of the East Harrisburg Passenger Railway Company, Harrisburg, Pa., writes: "We consider the vestibules referred to a decided advan-



nor handle them as readily where the rear end is vestibuled."

THEY SAVE FUEL.

George B. Hippee, manager of the Des Moines City Railway Company, Des Moines, Ia., writes :

"About a year ago this last winter a bill was introduced in our legislature to compel street railway companies in our state to vestibule their cars. This bill was defeated. At that time we were very much opposed to vestibules, thought they were a bad thing for the cars and would be a dangerous thing to invest in. Since then we have changed our minds. We have put on a number of vestibules this past winter and are very much pleased with them and intend before next winter to have all of our cars vestibuled. We think they are a very great and good protection to our men and that the men are enabled to operate the cars easier and with more care than they could without them, being protected from the cutting

tage in our climate, in protecting employes from the inclemency of the weather, thus enabling us to secure a better class of men than would otherwise seek such employment. In extremely cold, or in wet weather, we consider employes, who are unprotected less able to properly perform their duties, and in this manner subject their employers to loss both from accidents and from poorer service rendered their patrons. We therefore consider it better for the employes, the patrons of the company, hence the company, to adopt vestibules on their cars, as protection from the various disparities in this climate."

A. B. Dupont, manager of Detroit Citizens Street Railway Company, writes: "We have never used any vestibules as yet on our lines, but expect to do so next winter. However, we will only vestibule one end of the car, running all of our cars around loops, so as to avoid the necessity of putting one on the rear platform."

M. R. McAdoo, manager Paterson Railway Com-

pany, Paterson, N. J., says: "Our company voluntarily placed vestibules upon all of its box cars. It was done solely for the purpose of protecting our motormen against the weather, and it certainly is a success for this purpose. Otherwise, I see no benefit in a vestibule. In fact, with the particular kind that I have, which is partly closed at the sides, i.e. of solid material and not glass so that it cannot be seen through, it is objectionable, in not giving a clear view of everything on the street to the motorman."

C. S. Sergeant, West End Street Railway Company, Boston, says: "We do not use vestibules on our cars. We should not dare to do so for a moment in the conditions under which we have to run, believing the number of accidents would be very heavily increased if anything was placed in front of or beside the motorman to obstruct his view. In a fog, or heavy rain or snow storms, those being just the times when the motorman would naturally require the vestibule glass to protect him, it seems to me that the opportunity for vision with the glass up would be practically destroyed."

"Many of our lines run through residence quarters where there are many children in the streets, and as many of the streets are very narrow and the teaming traffic very heavy, we should consider the introduction of a vestibule as a sure guarantee of great increase in accidents."

A manager says: "We have always considered them objectionable for the reason that it tends to obstruct the motorman's view of obstacles in the street that he would be enabled to see and hear if not enclosed with the vestibule front. For this reason alone I consider them objectionable. We have in this climate but few cold days in which a protection of this kind would be appreciated, but even then with the platform enclosed with glass fronts, the frosty windows and the window posts and sash tend largely to obstruct the motorman's view. I am satisfied that the disadvantages, particularly in climates of this kind would far outweigh the benefits accruing to the motorman, if indeed it might be termed a benefit."

A Canadian manager writes: "To my mind there is no advantage whatever reaped by the company operating vestibuled cars. As to disadvantages. Of course the cost of vestibuled cars are greatly in excess of cars not vestibuled, which I consider is a decided disadvantage to the company operating cars."

W. A. Smith, general manager of the Omaha Street Railway Company, has never tried vestibules and has no desire to do so, as he does not want to obstruct the view of the motormen.

The vestibules shown are the standard round front vestibule of the Barney & Smith Car Company, Dayton, O., and two types of vestibule made by the Jackson & Sharp Company, Wilmington, Del. The Barney & Smith vestibule shows the closed front side and the open side, which add to the appearance of the car to which they are fitted. The Jackson & Sharp standard vestibules shown are the detachable canopies with side folding doors, and with steel gates, which make a fine looking car. The company also makes a handsome vestibule for use with the steam type of roof.

TOLEDO PARK AND CASINO.

BY HARRY F. REYNOLDS.

Street railway managers are beginning to recognize the necessity of maintaining parks and places of amusement to stimulate travel on their lines. The STREET RAILWAY REVIEW was the pioneer journal to bring this important subject to the attention of street railway managers, but like all new ventures the majority stood silently by to observe the result of those that were bold and venturesome enough to demonstrate the feasibility of the plan as a dividend paying institution.

A few years ago had the stockholders of a street railway corporation voted \$50,000 to purchase, beautify and equip a park as a means of increasing dividends, they would have been considered "non compos mentis" and well advanced upon the highway to financial ruin, by the rest of the street railway fraternity. But at this age of rapid advancement in electrical transportation, the road that has no park or resort of its own is considered behind



TOLEDO CASINO.

the times, and is to be classed with the horse-car age. The electric street railway as a mode of recreation is deservedly popular. It has been demonstrated as a fact that the masses of the people in our cities and towns will avail themselves of cheap transportation to places of amusement and recreation; and when the cost of admission is limited to the amount of their ride, they in large numbers take advantage of the opportunity to spend a few hours amid the breezes of a shady park. Managers have been quick to appreciate this fact, and there are many beautiful parks owned and maintained by the street railway companies, and free to the patrons of their road.

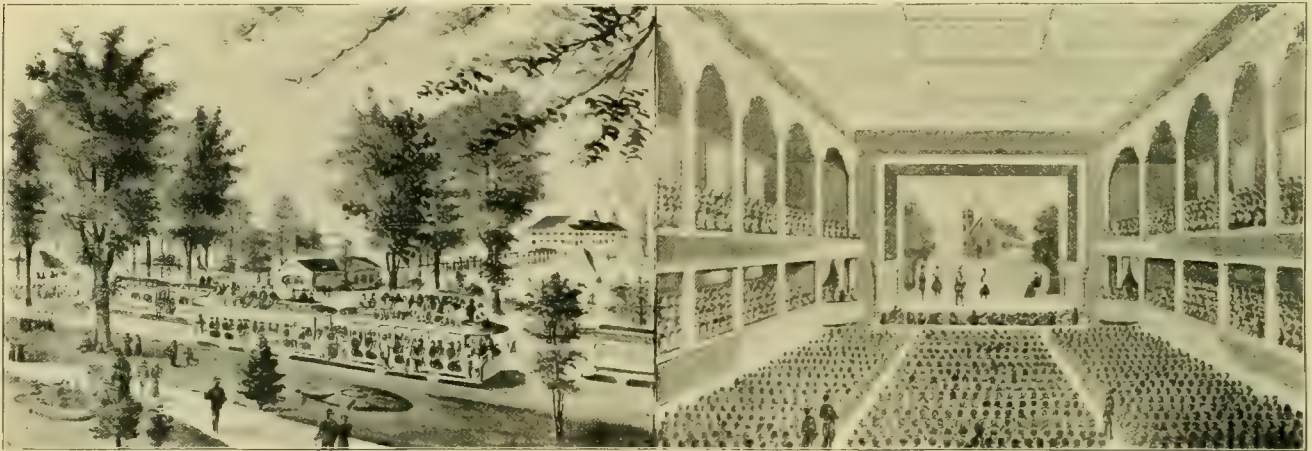
There is no place in this country where the idea has been more fully developed than by the Toledo Electric Street Railway Company, of Toledo, Ohio. Robison Brothers, owners and managers, conceived the unique idea of using Lake Erie as a part of their park. They purchased fifty acres of a grove on the banks of the lake five miles from the city, and proceeded to erect a magnificent casino 800 feet from the shore, which is 200 feet wide by 300 feet long, and is surrounded by a broad balcony forty feet wide, which makes a beautiful prome-

nade. The building has an auditorium, theatre, and music hall that will seat 3,000 people, and each afternoon and evening a band concert, theatre performance, opera, or some entertainment is given free—except on special occasions, when a small amount is charged for reserved seats. The merit of these entertainments may be understood by the announcement of a three days' engagement of the famous Innis band. Other sources of amusements are not neglected, as a magnificent dining hall and cafe are maintained, and to sit in a shady balcony, partaking of elegant refreshments, fanned by the cool breezes of Lake Erie, with eyes cast upon the vast expanse of water, listening to the soft strains of band or orchestra, is a source of delight and pleasure to the most fastidious. The park is not neglected, as it is equipped with switch-back, railway, merry-go-rounds, swings, boats, bathing facilities, and least but not last is a herd of Shetland ponies to amuse the young American. The park is brilliantly lighted at night, both with arc and incandescent lights,

The most conservative manager has no cause for hesitancy as to the result upon the dividends by a liberal outlay in maintaining a park or resort to popularize his lines. And those that have taken advantage of this dividend paying fact are to be complimented upon their energy in adopting the policy urged by the REVIEW for many years past.

CANADIAN ROAD ADOPTS ELECTRICITY.

The opening of the electric railway between Waterloo and Berlin, Ont., was fittingly celebrated by the mayors and officials of the two towns by a trip over the line in company with its builders. Berlin is a railroad junction, distant a couple of miles from Waterloo, with which communication has been maintained by horse cars. An investigation of the merits of electric traction led Manager T. M. Burt and Secretary Alex Millar to discard horses. E. Carl Breithaupt was employed as consulting



TOLEDO PARK AND CASINO.

and when coming in off the lake one might imagine that he was gazing upon a miniature World's Fair, as the many lights reflect the outline of the buildings upon the glassy surface of the lake. There is a double track to the grounds which gives good facilities for transporting the vast crowds that avail themselves of the many attractions offered. The popularity of the park may be understood when informed that on May 30, 15,000 people were transported to and from the park. On such occasions it taxes their equipment to the utmost, but they have handled all crowds without delay or accident. Each week there are excursions from distant points to the park, as arrangements have been made with the different railroads to transport the thousands of excursionist from the depots to the park.

They have a unique method of advertising, by enclosing a motor car in bill boards, decorated with gaily-colored posters. It is brilliantly lighted at night. This car is run on all lines in the city, and to attract attention by sound as well as sight a bell is continually rung inside.

engineer, T. E. McLellan, of Berlin, gave valuable assistance, and R. H. Fraser, of the Toronto and Suburban Electric Railway, took the contract for the electrical construction and supervised everything. Success would seem to be assured for the electric line, furnished as it is with an established traffic, experienced managers, G. E. 800 motors and Peckham trucks.

SLOW SPEED HELPS ELEVATED.

The Brooklyn Elevated Railroad has raised the wages of its employes to the standard of 1893, giving as a reason the increase in its revenues resulting from the diversion to it of a portion of the traffic of surface roads. Owing to the speed restrictions recently imposed by the city authorities the street cars run so slow that many persons who were in the habit of using them, have been driven to ride on the elevated, as offering more rapid transit. The street railway companies are endeavoring to have the speed limit removed.

TESTING LABORATORY OF THE WEST CHICAGO STREET RAILROAD.

Among the other refinements that became necessary in connection with the installation of electric traction on so large a scale as on the West Chicago Street Railroad, was an electrical laboratory fully equipped for testing underground feed cables. The number of such laboratories established by street railways throughout the country can probably be enumerated on the fingers of one hand. What is a plaything on a small road often becomes a necessity on a large system. A laboratory is indispensable where there is a large amount of underground feed wire, as is the case here.

For a distance of about a mile and a half on Western avenue the above company has a system of "National" underground conduit, into which there is to be drawn about 50 miles of lead covered feed cable. This conduit is the main feed line from the 11,000-horse-power station at Western avenue and Washington boulevard, which is also to furnish motive power for the Lake street elevated railroad. The cables are of 500,000 circular mils and under, and are guaranteed to maintain an insulation resistance of 1,500 megohms per mile for a period of several years. They are furnished by the Safety Insulated Wire & Cable Company of New York. To determine the insulation resistance from time to time and locate grounds as they occur, it was necessary to establish a laboratory.

The testing room is located in a quiet place, free from electrical disturbances and vibrations, at the corner of Campbell avenue and Washington boulevard, one block from the power house. It is in a room partitioned off in one corner of a horse barn owned by the company. A solid masonry pier capped with a glass plate was built, on which to put the galvanometer. The instruments in daily use are as follows: A Queen's Thomson 4-coil galvanometer with a resistance of about 6,000 ohms and which with 100 chloride cells in series is worked with a constant of about 200,000 megohms; a lamp scale for the galvanometer; a shunt box with a multiplying power of 10, 100 and 100; a megohm box; a battery of 100 chloride cells; a key for connecting leads to battery, or short circuiting the leads so as to discharge them after each test; two three-way plugs for changing connections when determining the galvanometer constant.

Carefully insulated leads run from the testing room to the basement of the power house 700 feet away where

connection is made with the cables to be tested. A telephone also connects these points.

For the sake of those not familiar with cable testing work of this kind, a brief outline of the method pursued is here given. Insulation resistance like any other resistance is inversely proportional to the current that will flow through it with any given electro-motive force. The problem then is to have some constant source of current which will give an unvarying voltage or electro-motive force and to compare the current that will flow through the insulation to be measured, with a known resistance. To give a constant electro-motive force, the 100 cells of chloride battery are used. The current required in testing is so exceedingly small that the battery voltage remains constant over long periods and deteriorates very little. The deflections of the galvanometer, except on very large deflections, are proportional to the current flowing through it. Before making a cable test the galva-



TESTING LABORATORY WEST CHICAGO STREET RAILROAD.

nometer is connected to the battery in series with a known resistance and the deflection noted. The resistance in circuit multiplied by the deflection will give the megohms resistance that are in circuit for one degree deflection of the galvanometer with a constant battery force. With the galvanometer now used, and 100 cells in series, one degree deflection will be obtained with about 200,000 megohms in circuit. This number is called the constant. As the current that will flow and consequently the galvanometer deflection in making any test is inversely proportional to the resistance, the constant must be divided by the deflections obtained from the galvanometer during the test of a cable in order to get the insulation resistance. The constant is determined before table testing is begun every day and is redetermined at intervals during the tests. The insulation resistance of the leads of course has to be determined separately every hour or two and the

insulation resistance of cable and leads together subtracted from it. Great care has to be taken in all these tests in order to get anything like accurate results.

Cables are pulled into the conduit in lengths of about 400 feet. These lengths are tested after being connected together. Each cable will be tested once a week for some time.

In testing, of course one lead is connected to the cable core and the other to the grounded lead covering. The insulation of the cable is thus in series with the battery and galvanometer. The current flowing when first the circuit is closed is much larger than soon after, because the cable acts a condenser and will store a certain amount of energy. After about five minutes, the cable becomes charged and the galvanometer deflection is nearly constant so that a reliable reading can be obtained. After each reading the leads are short circuited so as to relieve the cable of its static charge given it by the test and put it in reliable condition for another. In determining the constant the use of enormously high known resistances is avoided by shunting the galvanometer with a shunt, reducing the current one-tenth and using ten instead of 100 cells. The result is then multiplied by 100 to give the constant. The laboratory is in charge of W. A. Derby and was established by J. R. Chapman, superintendent of the electrical department of the company.

STREETS NOT A PLAYGROUND.

It is seldom that a daily newspaper finds that a city has a duty to perform in regard to trolley accidents, but that is what the Philadelphia Times has discovered. In commenting on a meeting to protest against trolley accidents, it says: "The one important measure of safety that was not considered or presented by the meeting last night is the plain duty of the city authorities, through the police, to prevent the children of Philadelphia from making our streets common playgrounds. It is idle to theorize about children playing on the streets. Parents cannot stop it, however wisely they may attempt it, but if it should become known as the policy of the city that any child found upon the driveway would be arrested and punished, it would speedily end the reckless exposure of children to trolley accidents which are not now within the power of the most skilled and faithful motormen to prevent.

"The time has come when the streets of this city must be set apart absolutely for the traveling public, and it is not compatible with the safety of children to have them use the streets as playgrounds. It can be stopped only by the city government taking the most stringent measures to prevent it, and until that shall be done there will be no safety for children in the streets, no matter how much the speed of the trolley car may be reduced.

"This is a progressive age, and Philadelphia must progress with the age. She was far behind even our inland cities in her local transit until the trolley cars appeared, and now that we have them, the old provincialists of Philadelphia insist that they must be subordinated to the pleasure or caprices of children who choose to play upon the

streets. Nine-tenths of all the children who have been killed or injured by the trolley recklessly exposed themselves in such manner as to make it impossible for motormen to save them.

"With all the destruction of life in Philadelphia, and it has necessarily been great, because our people are unused to the trolley and because of inexperienced motormen at the outset, the loss of life and limb by our trolley cars does not equal the loss of life and limb on our great steam railway lines in proportion to the passengers transported. This fact appears to have been overlooked entirely by those who seem to take fiendish delight in railing against every accident on our trolley lines, even when it is utterly impossible for the motormen to prevent it.

"The public have rights which must be respected, and in respecting those rights the city authorities should clear the streets of children, because in the present condition of the city the streets are as much a dead line for children as is the track of the steam railway anywhere in the city or country. Let us first of all be just to those whose limbs and lives are in peril, but let us also be just to the great city of Philadelphia."

It is about time the municipalities of every city took steps to keep children off the streets.

SEEKS FOREIGN TRADE.

It seems strange to hear of a shipment of steel rails from Chicago to a foreign port, but the Illinois Steel Company has gone down on the books as making the first shipment of rails from Chicago to a foreign port. The schooner *Ada Medora* carried 2,370 tons of rails to Owen Sound, Ont., consigned to the Canadian Pacific Railroad. This is such a small shipment for the Illinois Steel Company to make, that it was a surprise to the officers of the company to learn that it was destined to become famous. The Illinois Steel Company is doing a great deal of street railway work, and the high grade of its sections is so well known, and its facilities for turning out orders are so complete and immense that users of steel rails turn to it without looking elsewhere, when in want of supplies.



FOILED.

Conductor.—Madam, you don't mean this nickel fer th' crowd?
Madam.—Yep; them two ain't three yet, an' this one is in arms.

RECENT LOWER COURT DECISIONS.

Need Not Extend Its Line.

Judge Smith decided that a mandamus writ was not the proper remedy to compel the North Chicago Street Railroad Company to extend its cable line 300 feet. Property owners applied for a writ to compel the railway company to comply with an ordinance passed in 1886 authorizing the construction of the line, alleging that in building the line and stopping just short of the terminal indicated by the ordinance, it has failed to perform its duty to the public, and it should be compelled to do so. The company entered a demurrer to the petition, alleging that it could not be compelled by mandamus to do anything which was within its discretion to do. Judge Smith sustained the demurrer and decided that a writ of mandamus was not the proper remedy. He said the petition did not show that there had been sufficient time since the passage of the ordinance to construct the road, and what time is necessary must of necessity be left to the discretion of the company.

Twelve Miles an Hour Not Excessive Speed.

Judge Carpenter, Detroit, held in his charge to the jury in the case of the estate of Paul Gilloz vs. the Fort Wayne & Belle Isle Railway Company, that if the jury was to hold that simply because the car was going at the rate of 12 miles per hour, the company would be liable for damages, it would practically stop the operation of the electric cars. Under certain circumstances this rate of speed would be held negligent, as in a very crowded thoroughfare, or where a man was seen on the track and the motorman knew of it. Gilloz crossed the tracks immediately behind an eastward bound car. As soon as he reached the other track he discovered a westward bound car coming at the rate of 12 miles an hour. Before he could get his wagon off the track the car struck the rear wheel, upsetting the wagon and throwing him out. He received injuries which resulted in death. The court intimated that the conduct of Gilloz in turning across the tracks immediately behind one car without investigating whether the other car was coming or not, was negligence. A verdict was ordered in favor of the company.

Right of Way Decision.

The supreme court, Philadelphia, discovered a case of bribery. An electric road in Schuylkill county obtained certain rights in the township of Rahn, by the consent of one of the supervisors, in consideration of giving him employment for the balance of his natural life. This, the court says, was a very plain case of bribing a public officer. A consent so obtained, if otherwise valid, could confer no rights on those who bought it. The contract which was given was as worthless as the consent.

Liable for Only One Fare.

Judge Steele, of the County Court, Denver, decided that George Anstee could collect only the price of one fare from the Denver Tramway Company, which he sued for \$1,500. Mr. Anstee had a transfer and says he had

waited a long time for a car, and boarded the first car that came. He tendered his transfer, but the conductor refused to accept it, as the time limit had expired. Anstee refused to pay another fare and the conductor told him he would have to get off the car. With a technical show of force, he was ejected. He walked to the offices of the company, where he complained to Rodney Curtis, president, who offered him 5 cents, which he refused and began suit for \$1,500. The company made a tender of 5 pennies in court before the trial began, which was refused. After hearing the testimony, Judge Steele decided that Anstee could collect the amount of the fare and no more.

Must Keep Out of the Way.

Justice Warner, of the circuit court, Rochester, N. Y., in the case of Ellen Mulqueen, admx., vs. Rochester Railway Company, granted the motion of the railway company for a non-suit. The facts were practically admitted, except there was a slight difference of opinion as to whether the motorman rang his bell, which the defense thought was hardly important enough to refer to. The deceased, a woman 30 years old, daughter of plaintiff, was standing in the street and saw the car approaching. Another car was coming from the opposite direction, and as soon as that had passed she started to cross the street, or to signal the other car, and it appeared from the testimony of witnesses that she had no time to turn before the car was upon her. The company contended that if there had been no contributory negligence on her part, she would have stopped before attempting to cross. No matter how much negligence there might have been on the part of company, no action could lie against it unless plaintiff could prove that there had been no contributory negligence on the part of deceased. The attorney for plaintiff said deceased had a reasonable right to suppose that the motorman would slow up his car as he approached the street crossing to avoid running into people who might be crossing. The court granted the motion on the ground of contributory negligence, as the evidence showed that deceased saw the approach of the car, and while she might have expected it would slow down, still she could see that it did not, and if she placed herself in such a position that she was struck by the car it was an act of contributory negligence on her part, and the company could not be charged, no matter how negligent it might have been.

Attorney's Contingent Fees.

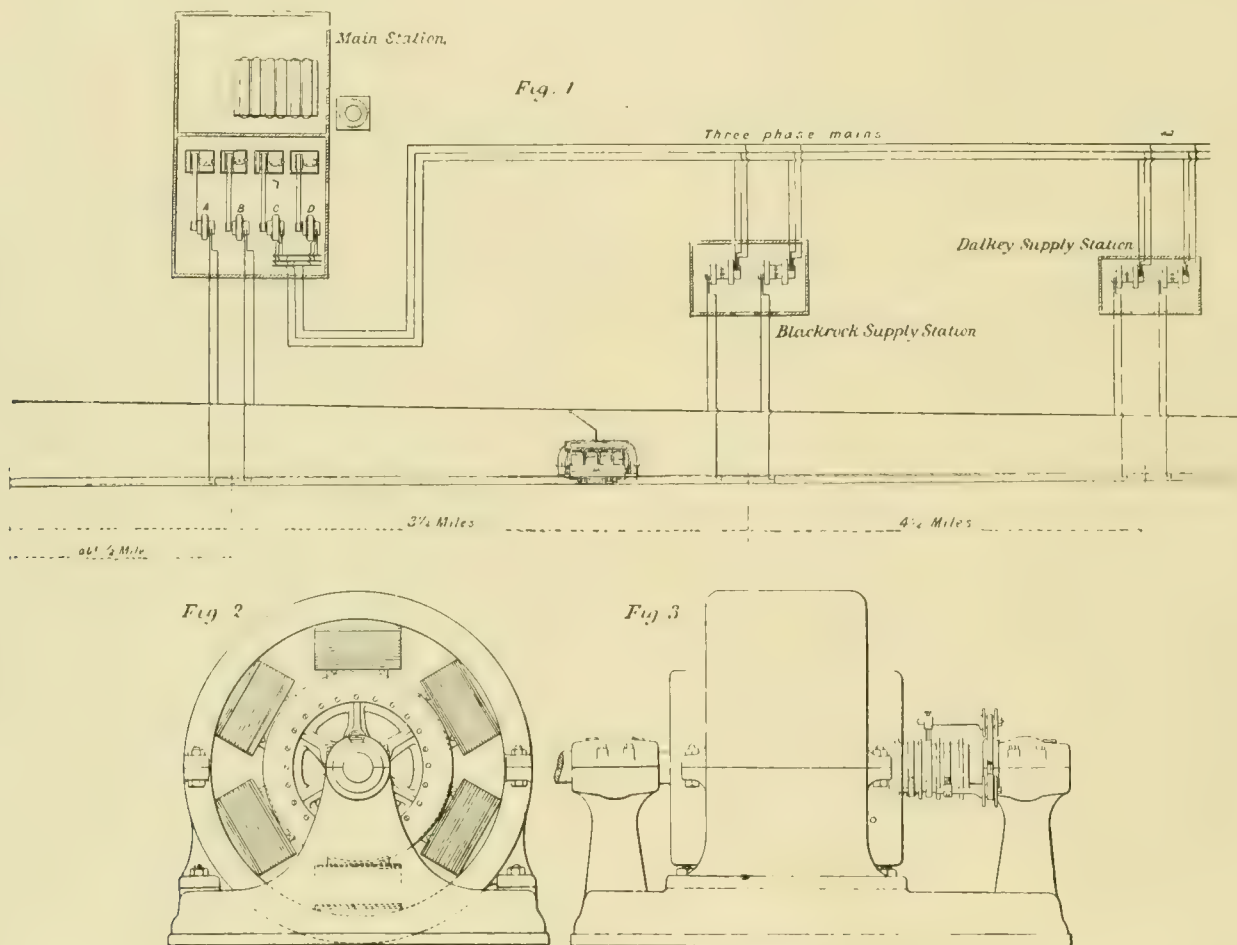
When an attorney in a personal injury case has, by stipulation with his client, a definite share in the judgment which may be recovered, the claim of plaintiff can not be settled by defendant without giving the attorney his stipulated fees or share, provided due notice of said stipulation has been given defendant. Judge Tuley has so ruled in the suit of Mrs. Fanny Yancey against the Chicago City Railway Company for \$1,700, which was settled privately for \$1,000, the claim of Attorney Louis Washington to 45 per cent having been ignored. The company had to pay his share, with interest and costs, and many suits have been started.

THREE-PHASE TRANSMISSION AT DUBLIN.

Second Electric Railway in the World to use High Tension Transmission. The Honors go to Europe.

In many respects the electric railway now being put in at Dublin, Ireland, is the most interesting in the world, because it furnishes an example of what all electric railway men have long been looking for, viz.: a railway run by high voltage transmission from a steam plant. The Norwich (Conn.) Street Railway has its station driven by power transmitted from a water fall, but the problem in this case is very different from that, when steam power

Three and a half miles from the power house is the first transformer station, which will be located in buildings previously owned by the company. Four and a half miles further is another sub station. For the long distance work two 120-kilowatt three-phase alternators will generate current at a pressure of from 2,500 to 3,000 volts and a periodicity of 30 complete cycles per second. These machines, which are shown in Figures 2 and 3, supply the sub-stations where two synchronous three-phase motors drive through insulated couplings, two ordinary 500-volt railway generators. The saving in line copper by the 3,000-volt transmission is of course great but the cost of the motor generators for reducing



THREE-PHASE TRANSMISSION AT DUBLIN.

is used, and when it is a question of either multiplying stations or transmitting power at high voltages to transformers along the line. An outline of the Dublin company's plans taken from London Engineering is herewith given. The Dublin road, is what would in America, be called an interurban. It is about $8\frac{1}{2}$ miles in length and for various reasons it was desirable to put the power house within $\frac{1}{2}$ mile of one end. Condensing water and cheap coal were among the points in favor of this location. To handle this length of line a combined direct current and three-phase transformer system is to be employed. The plan to be pursued is shown diagrammatically in Figure 1. The trolley line near the station will be fed by the ordinary 500-volt continuous current.

to 500-volts will partially, if not wholly, counterbalance this. It would be of great interest to know how the investment compares with 500-volt transmission calculated for the same loss. Probably the most potent reason for the adoption of the sub-station method was that the British board of trade prohibits more than 7 volts drop of voltage in the ground return and to keep within this limit several feeding stations became almost a necessity. The equipment that the present plant was designed for is 20 motor cars with trailers. The maximum drop in the ground return is calculated not to exceed two volts. The loss in the three-phase main, plus that in the trolley main, is to be 8 per cent.

The work is being done by the British Thomson-

Houston Company and the machinery and whole installation was planned by H. F. Parshall, now technical advisor of that company, and whose handiwork is shown in so much of the apparatus turned out by the General Electric Company. The Dublin Southern Company's electrical engineer is J. Clifton Robinson.

MAINTENANCE OF OVERHEAD WORK.

A few points regarding the proper handling of trolleys with reference to the saving of the overhead work, given by O. M. Rau in the Bulletin of the Milwaukee Street Railway, are of such a nature that they can with advantage be impressed on all trainmen, and if the suggestions are observed a saving in line repairs and a more satisfactory running of trolleys is assured. Although intended specially for the employes of the Milwaukee Street Railway, they apply with equal force to the conditions on other roads, and are therefore given here:

"The line patrol department of an electric railway forms an interesting study. The numerous variety of breaks and the endless number of causes for which the patrol is called out, give no end of investigation and suggestion to reduce or remedy the causes for the work of this department. The wire-breaks alone are a conundrum. Breaks occur in the most surprising manner. Occasionally the wire will break some distance in front of a car from apparently no cause whatever. No. 6 wire seems to break as easily as No. 4, and the wire will look as sound at the break as anywhere else. A number of breaks are traced to the fastenings or clips, where the wire becomes worn from the trolley. A little more care by the patrolman in keeping the clips in straight line with the wire, would reduce breaks from this cause considerably. A cause which very likely explains some of these peculiar breaks is the frequent practice of pulling the trolley from the wire while the controller switch is on. This causes a very vivid spark, the effects of which burn the wire and weaken it at this point, so that a blow from the next approaching trolley would very readily cause a break. Wire breaks at switches or crossings are caused by the continual thump which they receive from a trolley passing from wire on to switch, and the faster the car crosses these places the heavier the blow is that they receive. These breaks are perhaps unavoidable, but much can be done to reduce them by observing their causes and handling the car accordingly.

"The average conductor or motorman would think it absurd if he were told that this department was maintained to right the results of his carelessness, yet this is in nine-tenths of the cases a fact, and there is no doubt that this department would be greatly relieved if calls resulting from carelessness were omitted. The average number of patrol calls is as many as eight per day, and of this number six will be to replace span wires, displaced switches, or similar causes directly chargeable to carelessness. This not only means the repairs which the patrolman makes, but also the time of the repair wagon to readjust and bring the deranged switch or wire into

place with heave tackle and more care than the patrolman has time to use.

"In the central part of the system, where curves, turn-outs, etc., are very numerous, too much care cannot be taken to prevent trolleys from tearing frogs out of place, as the overhead work in many places is balanced by the strain of the curves at the different corners, and a heavy pull from a trolley caught in a span on one curve will affect the one at the further block equally. A poorly following frog is sure to lead to more serious trouble, and it would require a very extensive repair department to follow these repairs on a large system.

"To construct an overhead system so as to prevent the trolley jumping is almost impossible, as the causes are not dependent on the overhead structure entirely. The trolley wheels, the trolley bases, the track, the springs, and the cars all have their important functions to perform in reference to a correctly following trolley, and the car crews can do a great deal in pointing out where the defect is, by watching why and where their trolleys jump.

"A bad spot in the rail, if close to a pole where the wire is held rigid, will cause a perfect trolley to jump almost invariably if going at a good rate of speed. Badly adjusted springs on the cars will have a similar result, especially on an imperfect track or where there is a crossing switch or crossover. A trolley base with the tension of the spring too weak will cause the wheel to jump. A spring too tight will cause excessive wear on wheel and on trolley wire at clamp and switches. A hard-working swivel will cause a trolley to jump on the straight run of a switch, as it will spring the pole instead of being guided into the switch by the turn of the car. A bad trolley wheel is the most dangerous of all.

"All these different causes can best be located by the men running the car, and no doubt the repair man at the station will readily remedy any of the defects if pointed out to him, but if told that "the trolley doesn't follow" it will be perfectly natural for him to blame it to the overhead system. There is no one who can point out the defects of the system better than an observing conductor or motorman, and perhaps no one is more benefited by the repairs of these defects than the same parties."

WOODEN POLES IN THE SOUTH.

The life of wooden poles for supporting trolley wires in southern cities has been placed by one manager at from five to six years. Attention was specially called to the fact in one of the Georgia lines, where in a recent storm several poles snapped at the base. Inspection discovered the fact that a large number were in an unsafe condition and renewals are being made as fast as possible. The manager in question, says:

"We are replacing our poles with new ones as fast as the old ones rot out," he said. "It is true the iron posts last longer, but they cost a great deal more money, and we are not in a position to afford the extra expense just now. Cedar poles last longer than cypress and cost more money, but are more liable to break."



In this issue are reproduced blanks used by the claim department of the Lindell Railway Company, St. Louis. When a case is reported to the claim agent, Benjamin E. Blow, he sends out blank No. 1, enclosing blank No. 2 for a reply. These blanks are printed on note paper. When they have been sent out, the conductor's report, No. 3, is filed in an envelope about three inches in depth similar to the newspaper wrapper sold by the postoffice department. This wrapper has three folds. Two colors are used so that personal injury cases may be easily distinguished from other cases. The wrapper reproduced is about one-third actual size. The blank spaces are filled by typewriter. In personal injury cases the blank reads "case of John Smith attempting to board a car whilst in motion and falling." The remainder being filled in the same manner as the wagon blank. In these envelopes are kept all the papers relating to the cases. There is also a blank form for statements of witnesses, No. 4. Blank lines follow headings in No. 3 and No. 4.

The system used by the Lindell Railway Company, while simple, is most complete, and has the advantage

of lightening the labor without increasing it, in order to comply with the requirements of the system, which is

May 26th 1895.	
Case of	Collision with wagon driven by Aug Kamp.
Car No.	65
Conductor.	Martin Walsh
Motorman.	Chas Carlton
Collision with	Wagon
At	6th. & St. Charles Sts.
Damage to Wagon	Wheel broken
Damage to car	Very slight.
Report referred to	B. E. B.
For investigation	
FORM 49	

Form 49

Nº2

189.

What day and at what hour did the occurrence take place?

Where did it occur?

Where were you when it occurred?

Give full account of occurrence as witnessed by you

And in my opinion the

Was to blame for the occurrence

What is your full name?

Address

Form 12.

REPORT BLANK.

Nº3

Conductor

Motorman

Car No.

St. Louis, 1894.

LINDELL RAILWAY COMPANY.

St. Louis.

Nº4

STATEMENT OF

IN CASE OF

OFFICE OF
Lindell Railway Co.,
1330 CHOUTEAU AVE.
BENJAMIN E. BLOW,
Claim Agent

St Louis 189

DEAR SIR:

One of our Conductors having advised us that you were a witness to
which is reported
as having occurred at
about o'clock m., on 189
where a
is said to have
and in order that justice may be done the persons connected with same, we
respectfully ask that you write us your version of the occurrence on enclosed blank.

Thanking you in advance for the kind attention I am confident this letter will
receive, I am

Yours truly,

Nº1

Claim Agent

the case with some plans to save labor. We do not know how it is with the Lindell Railway Company, but the claim departments of some roads in large cities have as many as 1,000 claims each month to investigate. Of course they are not all personal injury or wagon cases, but each one demands a large amount of work. In order to accomplish it some system must be devised to keep track of the records of cases, the simpler, the better.

Barney Ginsberg and Joe Stein will attempt no more raids on the claim departments of street railroads for two years, as they have been sent to the penitentiary. With Yetta Bachak they attempted to defraud the Citizens Street Railway Company, Indianapolis, on an alleged personal injury case. They pleaded guilty and by consent of Mr. McLean were given the smallest sentence.

IS A MOTORMAN A SKILLED LABORER?

BY W. F. B.

In recent issues of the several electric papers which I read I have noticed articles in which it was claimed that motormen were not skilled laborers. In one article the comparison was drawn between a motorman and a locomotive engineer and the writer of the article held that any intelligent man could stand on the front platform of a motor car for half an hour and run a car just as well as his more experienced companion.

I have been in the street railway business since 1885, and in electric railway business since 1889, and I have yet to see a motorman who is perfect or who has learned all he can learn.

Let us imagine we are taking a trip with a motorman who has been running a motor car three or four years. We start from the terminus, and this being a morning trip the car is soon loaded and the conductor's register shows 75 fares collected. The front platform is crowded and the motorman has scarcely room enough to set his brake. We are running at 15 miles per hour when suddenly a woman tries to cross in front of the car. She is probably 50 feet away and would get across all right, but suddenly she slips and falls on the track. Our motorman with lightning rapidity shuts off power and sets his brake. The wheels slide but he lets down sand and applies his reverse current. Just as the life guard touches her clothing the car moves backwards and the lady is saved. The unskilled laborer has saved the company \$5,000 and does not faint. He is the first one to assist the lady to a position of safety, and as the passengers compliment him on the stop, "the feeling strong within him" is one of heroic pride, for he knows by his skill he has saved a human life and justly merits the praise he received. I am afraid the "half hour motorman" would not do in this case.

We resume our journey and have gone perhaps a mile when the car "bucks" furiously, the ladies scream and the smoke comes up through the floor. Then the reassuring voice of the "unskilled laborer" is heard. He

request the passengers to move off the trap doors over the motor, quiets the ladies by telling them there is no danger, and then examines the motor. He then tells the growler who wants his nickel back that he will be ready in two minutes. As it is only a broken armature terminal he bares the wire and makes a temporary connection, insulates it with a piece of paper and we are started again in two minutes. Could the "half hour motorman" have done this? Yes, if he knew where to find the trouble and how to fix it.

We go on a little further and an ash wagon driven by an ignorant boy drives in the track in front of the car. The activity of the motorman prevents a smash, and all the thanks the driver of the ash wagon gives is to curse and call the motorman vile names because he did not stop sooner. Our motorman smiles and hurries on as he has lost a few minutes and must endeavor to make it up or be reprimanded by the starter. And this is the man who is "unskilled."

The legislative bodies of the United States have for the past year been trying to adopt measures which would decrease the number of accidents on electric railways and in my opinion have generally been on the wrong scent. I do not believe there is a fender made that will prevent personal injury, and in some cases death. My reason for this belief is the fact that I have never been able to find an inventor of a fender who would stand on the track and let me pick him up going at the rate of 15 miles per hour. As to speed limitation, if we are going back to horse car time why have a rapid transit equipment. In my humble opinion the way to prevent accidents is to equip your cars with the best known appliances for stopping, employ only good careful sober men as motormen, pay them fair wages, work them reasonable hours, and accord to them the treatment skilled laborers should receive.

WHAT COMPANIES MIGHT DO.

"If the street railway company had any thought for the public they would have a flier of iced lemonade and blue ribbon lager in each car these hot days," is the sentiment expressed by G. Rowler yesterday. "Lemons are cheap and the conductors could mix the ingredients without much trouble.

"Another thing they might do is to place an electric fan at each end of the car. They should also have a supply of the daily papers in the racks, the latest magazines, fashion plates for the ladies, pick up the stock quotations as they go along, bulletin the baseball scores, equip each car with phonographs or an electric piano to play the latest airs, distribute bon-bons to the ladies, cigars to the men and cigarettes to the other sex.

"I tell you the cars would be patronized a good deal better if the comfort of the public was studied more closely by the directors. If I had that railway I'd show them how to run it."

After harrowing the feelings of the staff, G. Rowler left them gasping for the beverages named.

STREET RAILWAY SUMMER RESORTS.

The Ringing Rocks Railway Company, Pottstown, Pa., is fortunate in having peculiar and wonderful natural scenery to draw people to Ringing Rocks park. There are in addition Indian legends, while the company has not been backward in preparing artificial attractions to divert the attention of the visitors to other channels than the entertainment afforded by nature. Some of these attractions are shown in the engraving, and among them is a steam riding gallery, manufactured by the Armitage-Herschell Company, North Tonawanda, N. Y. Pottstown is only an hour's ride from Philadelphia by steam road, so the enterprising management of the Ringing Rocks Railway Company has opened an office in Philadelphia, where arrangements can be made for excursions and picnics. The company has issued a pamphlet of twenty pages with views and interesting descriptions of what is

June 23, Sunday, concert by chorus of 30 voices.

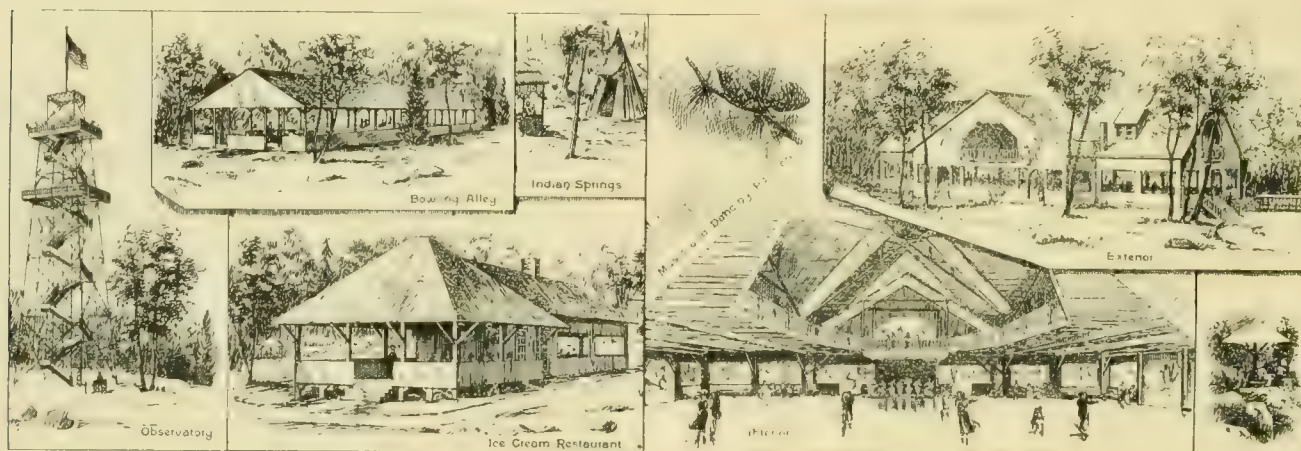
June 24-29, New York Opera company, 30 voices and full chorus, attended by clever comedians, presenting Pinafore, which has not been seen in Minneapolis for several seasons, the opera to be presented from the deck of a full-rigged ship, moored before the pavilion, and enlivened by novel effects in lighting.

July 1-6, same company presenting Olivette on ship-board.

July 7, Sunday, sacred concerts by band, introducing Russian quartet, which includes Princess Dolgorouky, the renowned violinist, who plays before the Czarina at her summer home.

July 8-13, military band, Russian quartet and the three Marvelles, grotesque acrobats, who appear in numerous unique and startling specialties.

July 14, Sunday, sacred concerts by Brooks' Second Regiment band, led by Ellis Brooks, of Chicago.



RINGING ROCKS PARK

to be seen, that must have been the means of bringing crowds of visitors, many of whom certainly keep it as a reminder of a pleasant outing.

The most elaborate entertainments in connection with street railway summer resorts are those to be given by the companies that have organized an amusement circuit. The program of the entertainments to be given at Lake Harriet, Minneapolis, by the Twin City Rapid Transit Company follows :

Sundays, throughout June, July and August, sacred concerts afternoon and evening, music to be furnished by such bands or orchestras as are engaged in giving concerts on week days, the programs to be supplemented by vocal solos, choruses, etc.

May 30, Memorial Day, concerts by Military band afternoon and evening, with grand display of fireworks in the evening.

June 10 to 15, Military band concerts and entertainments by Severus Schaeffer, the famous juggler, and Fisher Bros. and Gellar, the aerial wonders.

June 17-22, Military band concerts and entertainments by Takezawa's band of Japanese, including eight of the most expert acrobats and novelty entertainers; also Patterson Bros., performers on the triple bars.

July 15-20, Brooks' band, Harding and Ah Sid, in burlesque; Mlle. Olive, a famous juggler, and the three Nelson sisters in refined acrobatic specialties.

July 21, Sunday, sacred concerts, led by Ellis Brooks and the Second Regiment band.

July 22-27, Brooks' military band and the Dunham family, acrobats and aerial artists.

July 29 to Aug 3, Royal Hungarian band in native costume and playing the soft toned instruments peculiar to their land. Additional features, the Dunham family and Brandon and Regeni in their mystic globe act, one of the latest and most entertaining athletic novelties before the public.

Aug 4, Sunday, sacred concerts by Hungarian band and cornet solos by Alice Raymond.

Aug. 5-10, Hungarian band and Johnston Davenport and Lorella, comic acrobats.

Aug. 19-24, Military band and Juan A. Caicedo, "king of the wire," who performs marvelous feats on the tight wire, and allows the wire to be slackened under him while performing.

Aug. 26-30, Military band and Carlini's monkey and dog circus, introducing a large number of trained animals of wonderful propensities and almost human intelligence.

H. A. Everett intends to give the citizens of Detroit a treat for 10 days, beginning July 23, when the lines of the Detroit Railway will be opened for traffic. The company has a tract of land 730 feet long by 350 feet wide, in the northwestern part of the city, which is called Boulevard Park. A grand stand 300 by 100 feet has been built, in front of which is a lake 250 by 60 feet. On the edge of the lake will be a stage 100 by 50 feet. Here Paine & Son will display in fire works a representation of Thomas Moore's "Lallah Rookh."

The Columbia and Donegal Railway, Columbia, Pa., has many attractions at Chickies park. A first class orchestra has been engaged, which furnishes music for dancing.

A poster, 20 inches long, printed in four colors, announces the opening on May 24, of River park and Fern glen, when 16,000 people visited these two resorts, owned by the Winnipeg Electric Street Railway Company, Winnipeg, Man. Here is found nearly every accommodation known for pleasure seekers. Arc lamps give light at night, while shadows from the big trees make picturesque effects. There are picnic grounds, half-mile track for horses or bicycles, La Crosse, base ball, cricket, lawn tennis, quoits and croquet grounds, roller skating rink, Armitage-Herschell Company steam riding gallery, a popular attraction, pavilion seating 500 people, equipped with stage, foot lights, drop curtain, scenery, which is open for evening engagements to private parties, except when special attractions are put on. There are also goats, dogs and ponies for children, and special attention is given camping parties, no charge being made for tent room. Excursions from a distance are frequent, special electric cars connecting with all trains on steam roads.

The Leavenworth Electric Railway Company, Leavenworth, Kan., admits all its patrons to Maple park, without charge, but those who do not go on the cars of the company must pay admission. Louis M. Erb has many plans for the accommodation of the patrons of the company, which will develop later.

The Los Angeles Consolidated Electric Railway Company, will give "Pinafore" on a boat in Westlake park. No charge is made to visitors, except for those who occupy reserved seats. The boating privileges were leased for two years, for \$1,105. The fees must not exceed 25 cents an hour for a rowboat with one or two persons and 10 cents for each additional person in a boat. Some parks charge 35 cents an hour for a boat with one pair of oars and 50 cents for two pairs. The charges for sail boats are to be not less than 50 cents an hour.

The Pittsburg and Lake Erie railroad has effected a street car arrangement with the Homestead and Highland Electric Railway Company, which enables the citizens of Homestead, Braddock, McKeesport and other points up the Monongahela, to visit Schenley park. Excursion trains and extra Sunday trains are run.

The Bridgeport Traction Company, Bridgeport, Conn., inaugurated the season at Avon park with a display of fireworks and a band concert. On the advertisements of the opening were coupons which served as fares for

all children under 13 years. The scheme was a winner, as the children all wanted to go, and their parents had to take them.

The new Elgin-Aurora electric road will establish a park on 15 acres on the west bank of the river, between South Elgin and St. Charles.



LAKE PARK, MINNESOTA



WHITE SULPHUR SPRINGS



LAKE PARK, MINNESOTA

PARK AT NEVADA, MISSOURI.

H. C. Moore, owner of the Nevada City Street Railway Company, has a beautiful park which is known as White Sulphur Springs and Lake Park. The park is rich in springs, having sulphur springs, iron springs and crystal springs. Some views are given in this connection, that show a few of the picturesque spots in this 150 acres of park. Mr. Moore is desirous of adopting elec-

tric traction on his line. He advertises the park by means of circulars.

The Consolidated Street Railway Company, Grand Rapids, Mich., has relaid its track to Reed's lake. Concerts will be given every afternoon and evening. June 9, Harding and Ah Sid with Mlle. Olive, entertained the multitude with a comedy-acrobatic performance. Prof. Carlini's dog circus, ten Japanese acrobats, Hungarian gypsy band and other attractions have been engaged. The public can witness the performances for nothing, except the price of a car fare to the resort.

The Waukesha Beach Electric line will have a resort at Pewaukee, Wis.

When Barnum's circus showed at Clifton, the Paterson Railway Company, Paterson, N. J., carried 45,563 passengers on circus day, breaking the record of 42,830 passengers carried July 4, 1892, Paterson's centennial celebration. Manager McAdoo had 60 cars in waiting at the grounds, when the show closed. The cars were run under quarter-minute headway during the rush hour.

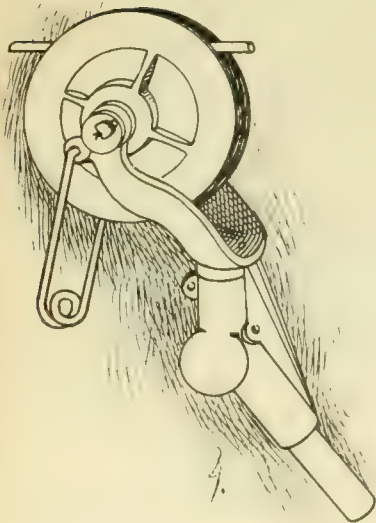
The Denison Street and Belt Line Railway Company, Denison, Tex., hired Prof. C. E. Hand, an impersonator, to give his entertainment at Exposition park, between numbers of a band concert. The company charged 10 cents admission to the pavilion, which was well filled.

The Brantford Street Railway Company, Brantford, Ont., celebrated the queen's birthday May 24, by formally opening Mohawk park and lake, to which a select party had been invited. The spot is so attractive that in itself it would draw, were there no other inducements.

THE CORCORAN TROLLEY.

A trolley working on the swivel or "chair caster" principle somewhat similar to those tried at various places

from time to time, has been devised by John Corcoran, of Harrisburg, Pa., and put on a number of cars of the Citizens Passenger Railway, of Harrisburg. It has, however, some improvements over those of similar principle which we have formerly illustrated. The swivel is made ball bearing so that the wheel accommodates itself much more readily to curves and switches than with a rough plain bearing. The rope attachment is another improvement not found on other swivel trolley harps. It has made a good record at Harrisburg and saves wear on trolley wheels as well as keeps the



THE CORCORAN TROLLEY.

trolley on the wire, practically doing away with all trouble from the trolley coming off.

TROLLEY FUNERAL CARS.

Liverymen thought it was bad enough to lose business on account of competition from bicycles, but comforted themselves with the belief that they had the funerals to fall back on for sustenance. Even that solace seems to be likely to be taken away from them by the electric lines. The East Harrisburg Passenger Railway Company, Harrisburg, Pa., makes a specialty of supplying cars for funeral parties. Tracks have been laid within the gates of the cemetery, which arrangement is a great convenience to patrons.

"The company hauls a great many funerals to the cemetery," writes F. B. Musser, superintendent of the company, "but we do not own a regular funeral car. We take the corpse and friends in one of our regular 25-foot bodies. Sometimes the corpse is hauled in a hearse and the friends go in a car. We charge \$5 for the car, except when the party goes to church and then to the cemetery, when we charge \$6. The party must come to a point where the car can be run between regular cars, which run on 6 minute headway."

Where it is practicable to introduce such a service, it is bound to become profitable. In the first place, especially in cities, the cost of carriages to funeral parties is about \$5 each. A carriage will comfortably seat four persons. There is an additional expense for the hearse. One car will take the place of several carriages, at the same time permitting the party to be more comfortable and to move more quickly to the destination. Where the deceased was a member of an organization, which desired to attend the services, the cars would enable it to save a large amount of money. Managers will not lose anything by investigating this class of service as it requires no outlay. In order to make it succeed the people must be made to know of its advantages, and they will be quick to appreciate them.

CAN'T GO TO HEAVEN.

That's what Rev. Erwin Dennet, of the Tabernacle Baptist Church, Brooklyn, says about presidents of street railway lines. In the course of a sermon he used these words: "Imagine a trolley road president in the New Jerusalem! Yes, but, you say may not a man be a Christian and be president of a trolley line? Most certainly he may, and these are the men we want there; but I cannot conceive of a Christian failing to equip his cars with an apparatus that will help to save life, if there be such an apparatus anywhere to be found. And we believe there are such. Imagine a man who fails to do this, living in heaven! Why, he wouldn't dare go out on the grand promenade, where the children play by millions, for fear he'd meet some little one whose body was crushed and mangled down here."

It seems impossible that a man who is supposed to have the brilliant mind necessary to occupy the position of pastor of a prominent church, could make such absurd statements, especially in the pulpit.



Interesting Bits of Information from all Parts of the Country,
Boiled Down for Busy Readers.

The Norristown & Chestnut Hill Railroad, Norristown, Pa., has opened its new trolley line, giving a 20-mile ride for 20 cents.

Every policeman in Brooklyn, N. Y., in order to ride free on street cars must show a certificate of his appointment, signed by the mayor.

Overhead work on the new line of Adolph Sutro, to the Cliff House, San Francisco, has been completed, and operation is expected to begin very soon.

Grading is being done on the new line of the Greensburg, Turtle Creek & Pittsburg Street Railway to Wilmerding, Pa., by Webb, Perkins & Co., of Williamsport.

Los Angeles will be electrically connected with Pasadena August 1, when the Los Angeles Traction Company completes the work of construction which is now going on.

Steel ties and 98-pound rails are being used throughout all new construction by the Detroit, Mich., Citizens' Street Railway company. This season 40 miles of track will be laid.

Akron's new car line to Barbertown, O., has been formally opened. The mayor and councilmen rode on the trial trip with General Manager Walsh and Superintendent McConnon.

Between Hartford and Manchester, the line of the Hartford, Manchester & Rockville, Conn., Tramway Company has been completed. The line is 9½ miles long, with a cross line at Manchester, 2 miles in length.

For the ensuing year the Rock River Railway Company of Rockford, Ill., has elected James S. Ticknor, president; Jason C. Ayres, vice president; H. B. Andrews, secretary; George E. King, treasurer, and F. G. Jones, general manager.

As yellow as its cars, the hand bills distributed by the Calumet Street Railway, Chicago, make a strong appeal to the thrifty citizens of the windy city, with the headline, "Four mills a mile." The handbill gives a map of the 54 miles of line.

Half-tone engravings representing a rustic scene in its San Lorenzo grove, dancing pavilion, club house, and car load of picnickers, are printed on time cards of the Oakland, San Leandro & Haywards, Cal., Electric Railway. Each card bears a different picture, on stiff white paper, 3 by 5 inches. The time is given in railroad style, with leaving and arriving time to the right and left respectively of a middle column of principal stopping places.

The Metropolitan Electric Company, Reading, Pa., which has leased the plant of the Neversink Electric Company, will use the water power plant to supply current for lighting the city, and employ the steam plant for furnishing power to operate the street railways.

Poor East Hampton, Mass.—She goes to sleep at early candle light. Citizens have petitioned the selectmen to stop its electric railroad from running into town after 8 o'clock at night, and to stop all cars on Sunday. It would serve the town right, if the company would rip up its rails.

Contracts have been let by the McKeesport & Wilmerding, Pa., Railway Company for extension to connect with the Versailles line, to George T. Rehn & Co., Hornellsville, N. Y. Six cars have been ordered. A picnic ground is being prepared and the driving park fitted up for races.

When lovely woman stoops to folly
She stumbles prone upon the dust;
But getting backward off the trolley
Car's less common now, we trust.

Contrary to the rumor of a change in personnel, the Citizens' Street Railway Company of Indianapolis, Ind., has re-elected the old officers, as follows: President, A. L. Mason; vice-president, W. L. Elder; secretary and treasurer, W. F. Mulholland, and general manager, Thomas H. McLean.

Would be wreckers stretched a two-inch rope across the tracks, two inches above the rails of the Schuylkill Traction Company, between Pottsville and Tumbling Run, and nearly threw two cars down a steep embankment. Fortunately the cars were going fast enough to break the rope, and no damage was done.

A Toronto saloon keeper is reported as saying that the introduction of electric cars in that city has greatly diminished the sales in saloons, as workmen who previously walked home in companies of from five to twenty, and stopped at the saloons on the way for a social drink, now ride home, and once there, spend the evenings with their families.

Overcrowding, during busy hours, is prevented to some extent on the Delaware County & Philadelphia, Pa., Electric Railway by having two cars run close together, the first flying a red flag to indicate that another follows close behind. A blue flag indicates that the car displaying it is a special and not available to the public during that particular trip.

An Indiana poet has dedicated these lines to "the car with the flat wheel":

The street car goes upon its way
With rattle, bang and clack,
It makes a dozen trips a day
When it stays upon the track.
'Tis old and racked, its wheels are flat,
It goes with jerk and thud,
And sooner than ride in a thing like that
We'd rather take the mud.



With this issue the REVIEW introduces to its readers a new department, designed especially for the purchasing agent, although the matter which will appear month by month will, no doubt, be of interest to all of our readers. The purchasing of supplies for a street railway company is an important department, for here is opportunity for wasteful expenditures, which will make a bad showing in the annual report. An efficient purchasing agent, however, has a splendid opportunity to make a record for himself and his road by being economical in the administration of his department.

This department of the REVIEW is thrown open to the purchasing agents with the invitation to use it. The REVIEW will be glad to receive communications regarding methods of work, humorous incidents, blanks used, forms of keeping accounts, questions of any sort relating to the purchasing agent's work, and any other information that the agent thinks would be of interest to others in his line of work.

* * *

Supply men are also invited to make use of this department. Here will be an excellent opportunity to get back at their purchasing agent friends by telling good stories on them. No stories will go, however, unless they are good and fresh. Suggestions as to how the purchasing agent ought to conduct his department for the benefit of the supply men will also be in order. In fact, anything that will make this department readable is what is wanted.

* * *

It has been found to be wise to have a supply of material on hand at all times that is likely to be required in an emergency. When the emergency occurs, loss will follow if any delay is caused by lack of material. It is also wise to have all purchases made by one man, for then a record can be easily kept and it will be known how much of any kind of supplies is on hand. If every department is allowed to purchase its own supplies, the departments may conflict and have more on hand than is necessary, which means waste of money. It is the practice on the best roads to have the various departments anticipate their needs a week or so, which gives the purchasing department an opportunity to classify its orders and test the market by securing bids, if there is a large quantity of anything needed, or to obtain prices, if there is not enough of anything needed to warrant bids being received. Where it has been tried, this plan has shown many advantages. It simplifies the work of the purchasing agent; it prevents the buying of unnecessary material, for the superintendent can tell as he glances over the

requisitions, whether the heads of departments are extravagant; it teaches the heads of departments to be careful in their use of supplies, and by collecting all the wants of all the departments at one time, it helps the securing of better prices.

* * *

In this connection is printed two blanks used by Robert L. Garth, purchasing agent of the Chicago City Railway Company. The first is the requisition, 8 by

No 4950

REQUISITION FOR SUPPLIES ON
PURCHASING AGENT

CHICAGO CITY RAILWAY COMPANY.

To be filled in by the Purchasing Agent

SUPPLIES	FOR WHAT PURPOSE	AMOUNT ON HAND

Signed

Approved

No 892

CHICAGO CITY RAILWAY COMPANY,
2020 STATE STREET

Chicago, 189

Please deliver

and charge to the account of Chicago City Railway Company

Put number of this order on bill *Purchasing Agent,*

10½ inches, which is printed with a stub of the same size, numbered and bound in a book. The head of each department is supplied with one of these books. Whenever anything is needed, he makes a requisition, a copy of which is made on the stub. The requisition is referred to the superintendent or president who examines it and approves it, as it stands, or cuts it down. It is next sent to the purchasing agent, who sends a memorandum to dealers for prices if the articles required do not happen to be in the store room.

When prices have been secured, an order is sent on the blank form 892, which is 7x4 inches and has a stub. A similar form is used when supplies are wanted from the store room. These blanks are used for supplies which it is no object to buy in large quantities. When large quantities are used, bids are called for on the basis

of a year's supply and a regular contract made. This system is simple, does not require much book-keeping, has very little red tape, and at the same time is economical in practice.

ELECTRIC TRACTION IN INDIA.

In an editorial, "Indian Engineering," published at Calcutta, lets fly a volley which betrays either a deplorable want of knowledge of electric traction, or some personal Calcutta jealousy towards Madras. It says:

It is not surprising that providing Madras with electric tramways is a ludicrously slow and uphill affair, and that it is difficult to get confiding shareholders to make up the capital necessary; yet there is scarcely a place where a system of tramways would effect a greater change.

Few reflect on what the introduction of modern appliances will do in lessening the inconveniences of tropical residence. Even the mere shortening of the passage to India, and having first-rate steamers at frequent intervals, has already deprived India of many of the terrors of exile. The colonial style of villa now rising in numbers at Karachi, of chiseled limestone, and with cheerful rooms, bay-windowed, has almost banished the ant-haunted, whitewashed bungalow from, at any rate, one Indian station. There is no question that hotels designed by real architects to suit local conditions, of which it may be remarked there is not a single example in this country anywhere, would vastly increase the first-class passenger traffic on the railways. Living in such a building, residents would almost forget where they were and hardly notice the heat, because no longer reminded of it by flies and insects and all those squalid features the architect can alone eliminate. But full success in this direction must be preceded by certain facilities, and in so intensely heated a locality as Madras with the fierce sun pouring down its rays all day and no relief at night, it is one of the essentials to be able to get about, or what is nearly the same thing in India, to send about, freely.

The flatness of Madras is all in its favor for laying tramways; the inhabitants being scattered over a considerable area, or some thirty square miles, makes it relatively a somewhat costly matter. Coal also has to be brought a long way, and firewood is scarce.

Under these circumstances an electric system of propulsion in which fuel would be used to generate electricity, and the latter be distributed over lengthy strains of wire to deliver a percentage of the original horsepower (and at, of course, an enormous wastage of it), would be about the last to commend itself to the cautious investor of his shilling-rupees.

Insulated wires put at the ground level readily dissipate the current, and both gutta-percha and India rubber are as sensitive to the Indian climate as the European constitution. The first cyclone must, on the other hand, flatten the whole network of overhead wires, which are as complete and airy as a cobweb; so that there is nothing except the rails and cars left, which is not, in the case of electric power being employed, at hourly risk of breaking down or perishing.

All the circumstances of Madras point to a steam tramway of some kind.

There is fortunately a working example of tramway exactly adapted to a tropical city to be seen any day at work in Batavia. Supposing tram rails laid at Madras and tram cars ready to run on them, all that would be required to complete the plant and begin traffic, would be a certain number of stationary boilers to generate high pressure steam, and locomotives to draw the cars.

At Batavia the tramways take the form of a train consisting of one or more cars labelled "For islanders"—the Dutch euphemism for our nauseous "3rd class"—and a car for Europeans and those ranking as such, by payment or otherwise, noiselessly drawn by what looks like an ordinary small locomotive engine.

But closely examined there will be seen to be a great difference, as there is no stoking, and the locomotive boiler space has nothing within it but a charge of high pressure steam. Thus its weight is very much less than if it were a generator of steam.

Following up this discovery, the investigator is led up to a pair of wagon-shaped boilers, placed in sheds which are two miles apart, and fired up to at least 150 pounds pressure. The locomotive which has done its run is shunted on to a siding opposite one of these stationary boilers, a pipe connection is made, and the locomotive boiler is filled in a few minutes with steam ready for another start. Each charge will suffice for a run of two miles.

The whole arrangement is the simplest thing in the world, but at the same time no one who had not examined the Batavian tramways at work—as the writer did in 1889—would have credited it as practicable. The mechanism appeared to be a German patent, but there is far from an absolute necessity to have it made in Germany.

One special advantage is, that there is nothing composing the tramway plant which might not be made up in India. The engines are neither large nor complicated, and the boilers present no novel features.

But in applying the principle on new ground, it seems possible to introduce not a few improvements. For example there is nothing in the way of a much higher pressure of steam being availed of than at Batavia and working by triple expansion, with great reduction of the locomotives in size, and of their grinding action on the rails.

If the shareholders of the Madras Electric Tramway were to force these considerations on their Directorate, and get direct steam traction adopted without the profitless intermediary of a host of silk and gutta-percha covered wires, they might even yet find they were possessed of a very valuable property.

That the editor has been duped into commending an absolutely worthless system—that of the steam storage—is evident. The scheme, for it is nothing more, has been tried repeatedly and in every instance thrown out as worse than worthless. The steam storage was attempted in this city several years ago, on an elaborate scale, and the writer personally devoted two weeks to inspecting the experiment. The result was an out and out failure, although undertaken in daylight hours of the hottest days of mid-summer. To prefer steam dummies of any nature whatever to an electric car, is to plow with sticks and build fires with flints. If fuel is expensive, all the more favorable are the conditions for a central power station where power can be generated at least cost.

We fear the whole trouble arises from a fear that the railway may run wires for motor work, and the electric fan throw the punkah pullers out of a job. Editor Pat Doyle had better come in out of the sun, get posted up and change his ways before he is left behind in the onward sweep of electric progress and advanced methods.

TRACK OBSTRUCTED BY TEAMS.

Merchants in Front street, Philadelphia, have been in the habit of using the entire width of the street while loading and unloading drays, undisturbed by through travel or street cars. When the Electric Traction Company recently began running cars through the street it was looked upon as an intruder, and the merchants easily persuaded themselves that drays had a right to obstruct the track. Encouraged by the attitude of their employers the drivers became more obstructive than ever, delaying cars for two and even three hours at a time. The police took a hand and, without the knowledge of the railway company, arrested a few of the teamsters, who were, however, released, as the city ordinance against obstructing highways is defective. The legal representatives of the traction company will take the matter into court and settle the question.

During the hot week in May, the rails on the draw bridge over the Passaic in Newark expanded so as to lock the draw.

BADGER LINE MATERIAL.

Simplicity is the end for which manufacturers of all kinds of supplies are striving. The line of overhead material here illustrated is apparently simple, and is without soldered joints. This feature has the advantage of saving money in many respects, while the manufacturers say the materials and workmanship are such as to produce a first class product at a low cost.

The mechanical clip shown in Fig. 1, has no screws, nuts or other threaded devices. Instead of the usual threaded stud there is molded into the bell, a taper stud which wedges between the two parts of the clamp, holding the wire firmly. A split pin inserted in a hole at lower end of stud keeps the clamp from coming off. To hang this clamp the only tool necessary is a hammer.

In Fig. 2, is shown the Badger trolley bell, an improved form of the W. E. hanger. Jarring cannot

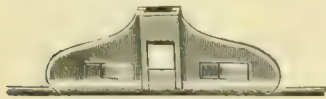


FIG. 1.

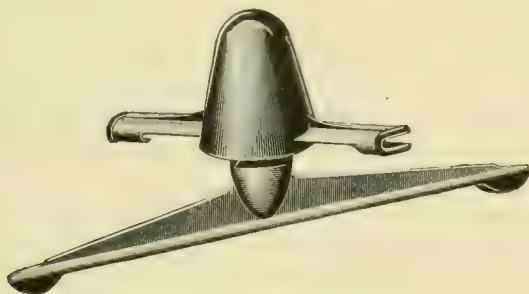


FIG. 2

loosen it, it is said; and it is made for both span wire and bracket construction. The frogs handled by the company are designed to prevent jumping and excessive wear of trolley wheels by keeping the wire on a straight line with the lower edge of the frog arm so that when the wheel leaves the arm its rim will run on the pan of the frog. Very sharp angles can be made by the adjustable cross-over shown in Fig. 3.

There is also handled the well known Badger insulator, pull off, strain plate, sleeve, circuit-breaker and



FIG. 3.

section fuse-box. The latter is intended to be placed between section insulators or circuit-breaker and supplied with a light fuse, heavy enough to permit one feeder to assist another during overloads, and yet light enough to blow in case of a ground or wire-break.

While the regular Badger hard brass material is very reasonable in cost, duplicate switches, etc., are made of malleable iron and sold at a little more than half the price of the more expensive brass. Purchasing agents seek-

ing to economize should bear this in mind. Particulars may be had by addressing the Badger Manufacturing Company, Milwaukee, Wis.

STRIKE AT CARBONDALE, PA.

The discharge of three employes of the Lackawanna Valley Rapid Transit Company, of Carbondale, Pa., caused a strike May 11, which lasted for a week. The 60 employes were members of a labor union, and when it was rumored that the men discharged had been removed because of pernicious activity in the affairs of the union, they became indignant and quit work. Sympathizers undertook to prevent the running of cars with new men and came into collision with deputy sheriffs. After a few days the rioting was suppressed and the cars kept running.

The striking employes were induced to meet the officials of the company and attempt an amicable settlement. At the conference it was developed that the men had been misled into the impression that the discharged men had been dropped on account of their activity in the union. Superintendent Duncan stated that he had never discharged any man because he belonged to a labor society and that he preferred union to non-union men. President Aitken spoke in a similar vein. The outcome was that the men returned to work pending an investigation of the three discharged.

CURE FOR HITCHING.

One of the annoyances of street railway traffic is the practice of boys hitching on the cars. It not only interferes with the enjoyment of passengers, but it keeps conductors busy chasing them off, and if one happens to fall, there is a possible claim to defend. The street railway systems of Chattanooga are peculiarly fortunate in being able to put a stop to this bad habit. The fee system is the rule in the justice courts, and motormen on the various lines have been appointed special officers. The motormen have been arresting the boys, who were brought before the magistrates charged with malicious mischief, swinging on moving cars. Fines of \$2 and costs were assessed. The bill of costs in one case amounted to \$9.05, being affidavit and warrant, 60 cents; docketing, 15 cents; taxing costs, 15 cents; subpoena state's witness, 40 cents; jail mittimus, 50 cents; work-house mittimus, 30 cents; judgment, 75 cents; arrest, \$1; committing to jail, \$1; summoning four witnesses \$1; attendance claimed two witnesses, \$1; fine, \$2. If the prisoner was taken to jail there would have been an extra charge of \$2.40, jail fees.

As long as this practice is permitted, so long will it continue. It is useless to drive the boys off the cars, as they will jump on the next one. The only effectual cure for any of these evils is harsh measures. If the ordinances against them are only enforced, the practices will soon be abandoned.

CHICAGO GENERAL vs. CITY RAILWAY.

That one street railway company has the right to use the connecting tracks of another street railway without compensation, is the principle at issue between the Chicago General Railway Company against the Chicago City Railway Company. Arguments on petition for a perpetual injunction restraining the latter company from interfering with the passage of its cars on Twenty-second street from the bridge to Grove street, about 300 feet, have been heard by Judge Tuley, of the Cook county circuit court. This is the case growing out of the smashing of the car of the Chicago General Railway Company by employes of the Chicago City Railway Company. Should this principle be established by the courts it will not only permit all existing street railway companies to run their cars over the tracks of other companies, but will permit companies which own no tracks to use the tracks of other companies.

The facts of the case are that the east approach to the bridge was built by the city and paid for by the Chicago General Company. The rails were laid on the approach by Chicago City Railway employes, the centers having been given by the engineers of the City Railway Company. The old rails which were replaced by the new were five inches out of line with those on the bridge and were without bridge shoes, while bridge shoes were laid on the new approach by the City Railway Company. The tracks on the bridge were laid by the Chicago General Company, which sets up the claim that it had the right under its ordinance to run as far as Grove street, but was prevented from doing so by the wrecking of its car by the Chicago City Railway Company.

The argument of the Chicago General Railway Company's attorneys, Peck, Miller & Starr, and C. C. & C. L. Bonney, and Lyman Paine, and made by Merritt Starr, had three divisions: first, that the rights of the parties in the street and in the 300 feet strip of track between the bridge and Grove street were mutual, and not exclusive. Second, that the wrongs done and threatened were such as make injunction the proper remedy to prevent their repetition.

The third division was consideration of the defenses suggested by the answer.

The points made under the first heading were:

1. There is no exclusive right or license to any street car company to occupy exclusively any portion of a public street.
2. All grants or licenses of this character are subject to future modification, regulation and repeal.
3. Any such grant purporting to be exclusive is beyond the power of the city and is against public policy, and is unconstitutional, and is void.
4. The constitution of 1870 itself constitutes a modification of all prior licenses, and an establishment of the rule for all future licenses.
5. The terms of the ordinances of the city generally (and in particular of the ordinance under which defendant claims to occupy the locus in quo) expressly assert

the common rights of the public in the street and the liability to future modification and regulation.

6. The ordinance under which the complainants claim is itself a modification and regulation of the prior ordinance of the defendant.

7. The cases which treat of the right of one company to use the tracks of another as arising upon paying compensation, apply only where the legislature by its regulation has required it, and the parties have been unable to agree. Here the parties have agreed.

These seven propositions all develop the general doctrine that the rights of no party are exclusive, and that the rights of all parties in the street are mutual and not exclusive.

The Chicago City Railway Company, which was represented by Judge Julius S. Grinnell and John P. Wilson, set up the following defense in its answer:

1. That the defendant has the exclusive right to the 300 feet in question.
2. The right to defend that right by the exertion of so much force as may be necessary, and that it is to judge of the necessity, as it did in this case. To this the General Company replies: "The rioters had not the slightest excuse for their course. They had effectually blocked the passage of the car beyond the joint right of way by fixing the wrecking wagon, heavily loaded with iron, across the track at the east end of the approach. All of the riotous acts were done after the barrier had been made complete, and were done at the threshold of the joint right."
3. The tracks are not connected; no connection ever has been made; that it just happened so they have laid their rails to exactly conform and connect with the complainant's tracks. This is denied by the complainant.
4. The Towns Company has no right to use the tracks, as it parted with its right by lease.
5. The General Company acquired no rights under the lease, because the lease is void.
6. The City Railway owns real estate in the street which can only be transferred by writing, under the statute of frauds.

As to 4 and 5 the complainant maintains that the defendant in its answer admitted the lease, and the subsequent allegations thereon are repugnant to the admissions, and nugatory; also that the lease is specially authorized by the Act of February 12, 1855. To the sixth position the plaintiff submits that the defendant does not own real estate in the street; that part performance takes a contract out of the statute of frauds in equity; that estoppel in pais by inducing another to believe in the existence of a state of things which defendant denies, and to change his position by reason thereof, estops the defendant from asserting his claim, and that the statute of frauds has no application to defeat this rule.

In his argument for the defense, Mr. Wilson said the City Railway had received no legal notice of the intention of the Chicago General Company to operate over its tracks. Nor was any claim of right to operate made at any time, and that the affidavits in evidence cut no par-

ticular figure. The money was expended by the Chicago General Company before the City Railway did any work, and the Chicago General Company was not induced to deposit money by the laying of tracks by the City Railway Company. All this was subsequent to the payment of the money, and the Chicago General Company was not induced to change its position by anything the City Railway did. Having failed by negotiation, and failed by ordinance, the Chicago General Company deliberately undertook to get some rights by spending money. By advancing money the company was paying no debt of the City Railway, nor was it for its benefit, nor at its request was anything paid, or required to be paid by the Chicago General Company.

Under section 13 of the ordinance the Towns Company had no right to assign its rights to anybody. Authority for the transfer must be found in the law, or the instrument that gives it. The destruction of the car could not give the company any right to use the tracks of the defendant. The injunction must be based on the right to use the tracks. If the directors of the City Railway had allowed the plaintiff to take its tracks under such a notice and such a claim, as appeared in the newspapers, they would have been so derelict they ought to have been kicked out of office. The City Railway was entitled to compensation for the use of its tracks, which must be acquired by condemnation, if no agreement could otherwise be secured. The case at bar was without precedent and was absurd. If it were upheld any corporation with \$5, \$10, \$15 or \$20 capital could put its cars on the Lake street L structure or the structure of any elevated road, because it is in a public street. The supreme court had decided again and again that one railroad could not condemn the property of another railroad for the same use for which it was set aside, but it could take the property for a different use, such as a crossing. In the case of the C. B. & N. R. R. vs. the I. C. R. R. it had been decided that one railroad could not condemn the unused right of way of another company. It was against the policy of the law to permit the Chicago General Company to use the City Railway tracks without compensation. The City Railway did not claim an exclusive right to run cars on Twenty-second street, but it did claim the exclusive right to run cars over its rails. The Chicago General Company by the connection at the bridge waived its right to go to Grove street. The Chicago General Company had no more rights than if it had paid for the work after the protest of the Chicago City Railway Company. The rails in the street were the property of the City Railway Company and were not abandoned by the owner to the public. No one would be allowed in law to operate over them a carriage constructed especially for running over those tracks and not adapted to run over any other portion of the highway. The principle sought to be established would be destructive to all street railroads. In support of his argument Mr. Wilson referred to many authorities which decided that compensation should be made for the use of tracks.

John S. Miller in closing for the plaintiff, said: "The

question involved was the right of the plaintiff to run its own cars on its own tracks to Grove street. The connection at the bridge did not cut off the right to operate, and could have no other purpose at all, except to run cars from one road to the other. The cases cited by the defendant's attorney relate to connections with steam roads, which were desired to facilitate the transfer of freight, whereby the cars of one company loaded with freight could be run over the tracks of another company to their destination, so save the expense of transfer from the car of one company to another. With street railways the case was different. They carried passengers who could get out and walk, if there was no connection, but the connection having been made carried with it the privilege of the use of the tracks.

The extent of the right of the City Railway Company in Twenty-second street was the right of passage with cars, the carrying of passengers for hire, and putting in track to place the street in condition for use, so that it could enjoy its rights. In Illinois there was no ownership by the street railway company for anything put in the street. It was all public property. The right of the public to travel over the tracks was not by license of the City Railway, but because the track had been put in a street owned by the public. The public was not a licensee, but exercised his rights over what was owned by him, or was held in trust for him. Decisions in other states, which apparently were in conflict with this statement, were where the companies owning the franchises paid for them which was not the case in this state. The iron of the tracks was devoted to the same purpose for which the pavement was devoted, and the public had the same right unrestricted to travel over it as over the pavement. The street railroad was a method of public travel, if it were not, the council exceeded its power in granting franchises. The rails being public property, they could not be condemned. The railway only got the right of passage and acquired no private right of property in the streets.

Compensation in any event could be only nominal as there was nothing of the City Railway Company's taken. No substantial damage could be shown, and the company could not stand in the way of public improvement.

Outside of Budapest electric traction has not made much headway in Austria-Hungary. The only other road is at the watering place of Gmünden on the Lake of Traun, where there is a trolley line a mile and a half long, having grades $9\frac{1}{2}$ per cent and many curves. Egger & Co. of Vienna, did the electrical construction.

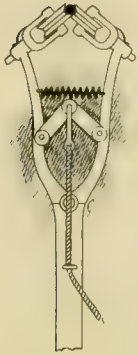
Newcastle, Eng., is vacillating between the cable and the trolley. No sooner had Parliament granted the corporation power to operate its lines by cable, then a firm of electrical engineers offered to put in a trolley line and guarantee a dividend of 6 per cent with fares limited to 1 penny per mile. If the objection to overhead wires in the center of the city can be overcome electricity will carry the day.

GLEANINGS FROM THE DAILY PRESS.

"A Little Learning is a Dangerous Thing."

Among the thousands of items concerning the street railway business which come into our offices each week, there are always many that are amusing in the extreme because of the utter ignorance of the writer on the subjects he treats. It would be entertaining, if not instructive or profitable, if we could reprint all of these items each month. That, however, would be out of the question, but we cannot refrain from serving up a few of the choicest bits from time to time.

Here is a trolley wheel that is recommended by the Philadelphia Record as a good thing. We are afraid if the Record man had to run a car with such a trolley a few blocks he would change his mind.



The Chester, Pa., Times, in speaking of another invention says: "A novel way of heating the car, and at the same time keeping the motor cool, is the patent of James Devine, of Clifton, who is experimenting on a Delaware county and Philadelphia car. Two pipes are run from the top of the car down to the motor gearing. The motion of the car

against the air forces cold air down to the motors, which heat it and send it into the car. The company is giving it a trial and think it does the work right." With some motors that we have heard of a car could probably be heated in this way in the coldest weather.

A dispatch from Graceville, Minn., to the St. Paul Pioneer Press announces authoritatively that "It now seems that among the important innovations of the present century, will be perpetual motion." A gentleman of that place has obtained a caveat on such an invention according to the dispatch, and has not been able to secure a patent yet because it requires a special act of congress. This is as it should be. The inventor of perpetual motion ought to have a special act of congress in order to get his ideas patented.

The Philadelphia Times has a solution of the convertible car problem which has probably not cost it five minutes thought. It reasons thus:

"Why store up the summer trolley cars over winter at the depot when they could cheaply be incased in aluminum sheets with a few openings for windows? An aisle in the middle could be made by removing one seat. The comfortable seats in them would surely attract people, and the cars would not be unproductive during winter."

Imagine a hardware store rolling down hill on a frosty morning and some idea can be had of the pleasures of a ride in such a car. To the soothing noise should be added the comfort of contact with the cold conducting aluminum.

The Fort Wayne Journal has discovered a cure for electrolysis which we have not heard suggested in any

of the technical articles on the subject. Its idea is summed up in a nutshell when it says "The next public necessity will be magnetized water pipes."

It is remarkable what uncultivated possibilities there are in the street railway business. The Mobile Register has apparently been one of the first to appreciate what the possibilities are, and inventors will do well to read carefully the following words of wisdom:

"Heating of electric cars by electricity is now becoming the popular thing. There is much in providing for the comfort of patrons in this era of gaining speed; but nobody appears to have thought out some improvement in the clumsy way now in vogue of stopping an electric car when human life is in danger. An electric appliance might be added to every car by which it could be brought to a standstill without having to depend upon the action of an excited motorman who, in the gravest of emergencies, is compelled to work both hands at once in operating a break on each side of the car."

During the Brooklyn strike the Chicago Times had an interesting item about the "pranks" of the men.

"In some sections of Brooklyn the trolley car strikers are trying an interesting experiment. Aware that silk is a good conductor of electricity, they are twisting silk ropes and tying one end of each to an elevated railroad pillar, to the other they attach a stone, which is thrown over a line in the hope that the current of the latter will thus be grounded and the motive power rendered useless. Thus do disputes breed deviltry."

The new motors that were put in at Youngstown last winter are a kind that ought to be on every road, if the Youngstown Telegram was correct in its statement that "the car ascended and descended the steepest hills in the city with no connection with the trolley wire, with the greatest ease, and at the same time was entirely in the control of the motorman and could be stopped and started just as easily and with as little trouble as if with the usual connection with the wire."

The Brooklyn Citizen must have an electrical detective and editorial writer, that would put Sherlock Holmes to shame. Who would have thought until the Citizen mentioned it that such a plot was on foot to deceive the Brooklyn public, as is unearthed in the following editorial:—

"The story told in the Citizen yesterday of the wrecking of John P. Rohr's saloon at Driggs avenue and Leonard street by a trolley car, illustrates the danger that lurks in the trolley wire when charged with an electric current sufficiently strong to send a car along at a rate of thirty miles an hour.

It does not appear at what rate car 1,931 of the Flushing avenue line, which did the damage noted, was moving at the time, but the fact that it dashed along for a hundred feet after leaving the track, mounted the curbstone and knocked in the front of a house, is sufficient evidence that it was going at a most terrific pace. Such a pace could not be attained of course, if the current sent through the wire was not of so high a character as it is.

When it was proposed to introduce the trolley here,

inquiry was made of the railroad presidents by the Aldermen concerning the power to be used. This was prompted, presumably, by the frequent killing of horses and other accidents on trolley lines in Newark at the time, and the railroad men quieted Aldermanic fears with the statement that 500 volts would be sufficient "to move the cars as fast as desired," and it was known that less than 1,000 could not kill a man.

When, however, the scheme of giving people rapid transit on the surface in order to give value to worthless traction stock was conceived, it was found that 500 volts would be entirely too light a current "to move the cars as fast as desired," and inasmuch as the companies are still defying the law relating to speed, it is altogether likely that the current which sent car 1931 crashing through a house at right angles to the track, was nearer a 3,000 than a 500 voltage.

The instant killing of a strong and sound horse near the Bridge entrance by the touch of a broken wire, also shows that the voltage is a great deal higher than is requisite "to move the cars as fast as desired" by the public; and there being at all times real danger that human beings may be struck in a vulnerable spot and killed by a wire that suddenly breaks in a crowded street, this is also a point to which the attention of the authorities should be directed, and would be if they were really in earnest in the expressed determination to do justice between the railroads and the people."

To cap the climax comes the reported statement of a San Francisco conduit system inventor, who in setting forth the drawbacks of the trolley system says:—

"As it stands to-day the overhead electric lines are compelled to have "feeders" every five blocks to keep the wires working. And still they wonder why there should be any leakage of electricity. From 5 o'clock in the afternoon until late at night, when the air in San Francisco is wet and soggy, the power falls in a shower of fire to the ground. Of course, you can't see it, but the fact remains that such is the case."

What a wonderful thing this invisible fire must be!

WILL SOON HAVE TROLLEY PARTIES.

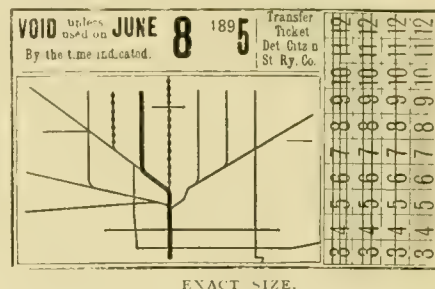
The trolley is commencing to get in its work across the sea as is evidenced by the following from the Isle of Man Times:

"Along the route of the electric tramway a new pleasure resort will be open to visitors when the season commences. The name of the new resort is Garwick Glen, which, under the name of Glen Gawne, has long been known to be as charming a bit of glen scenery as is to be found in the Island. It has hitherto been too inaccessible to become a popular resort for visitors, even though it leads on to a most picturesque little bay. But now that an electric tram station is being erected close by, there is every prospect of its becoming one of the most popular resorts in the Island for summer visitors, offering as it does, a pleasant morning, afternoon or evening excursion from Douglas."

DETROIT TRANSFER SYSTEM.

Albert E. Peters, secretary of the Detroit Citizens Street Railway Company, has sent the REVIEW a description and specimens of the new transfers used by the company. The ticket is $2\frac{3}{4}$ by $1\frac{3}{4}$ inches, and is shown in this connection.

The system is not complicated, but exceedingly simple to those who are acquainted with the lines of the company. The company requires passen-



gers to transfer at the first point where they reach the line to which transfers are given.

The heavy line is the line from which the transfer ticket is given, and the dotted line indicates that no transfer is issued to the line so marked. A transfer can be had to all the other lines indicated by the uniform straight line. The numbers on the end of the ticket, with no line through them, indicate the even hour; one line, 15 minutes; two lines, 30 minutes; three lines, 45 minutes; so that it is only necessary for the conductor to punch the ticket twice, one punch indicating the line to which the transfer is given, and the other, the time up to which the transfer is good. The morning ticket shows the hour from 5 to 2, and the afternoon ticket from 3 to 12 midnight. The color is changed on these tickets twice a day, one color for the morning and the other for the afternoon.

NOT HIRED TO POSE.

It is related of a president of a company in a town which supports two large street railway companies, that he has by means of an object lesson, taught his conductors the duties of their position. Complaints were so frequent that conductors and motormen did not stop for persons who happened to be a short distance away from crossings, that at last they became tiresome. One morning the president got on a car and watched the conductor who looked neither to the right or left, but kept his head steadily in the direction in which the car was going. With every block the president got madder and madder. At last he is reported to have reached the limit of his patience and walked out on the platform. He seized the conductor's head, turning it first in one direction and then in the other, accompanying the exercise with the remark:

"I hire you, sir, to look up and down street for passengers, instead of standing here like a statue."

What will be the longest electric railway in England is proposed between Derby and Ashbourne, by way of Kirk, Langley and Brailsford.



Electricity is to be adopted on the tram lines of Cape Town, South Africa, 24 miles in length. Dick, Kerr & Co., are to furnish the rails which will be $5\frac{7}{8}$ -inch, 80-pound and grooved.

China will have a genuine taste of modern civilization when L. S. J. Hunt, formerly of Seattle, Wash., constructs the electric trolley street car system in Shanghai, for which he has obtained the franchise.

Samuel Schoch, one of the organizers and manager of of the Rapid Transit Street Railway Company, Newark, N. J., died recently, aged 60 years. He had been officially connected with railroads since his youth.

A light railway from Poulton to Garstang, Lancashire, Eng., has been projected with the approval of the local authorities, to provide direct communication with two trunk lines of railway and the Blackpool markets.

"Dam," with a big D, is the word displayed on the front of every horse car in Amsterdam, Holland, to indicate that the car runs to the central square of the city. It also saves the driver oral profanity when teams get in the way.

At Liverpool the Mersey Railway, a short line passing through a tunnel under the Mersey River, will be equipped with electric power in place of steam, for which purpose an expenditure of \$1,000,000 by the company, has been authorized by the House of Lords.

Egypt is attracting the attention of electric railway builders. Several applications are on file for franchises in Alexandria. In Cairo a franchise has been granted a Belgian syndicate, and another party is endeavoring to obtain a concession for a trolley line from Cairo to the pyramids.

Oporto, the city of Portugal, whence port wine derives its name, is to have an electric railway. The municipality will build an experimental line 2 miles long with many curves and steep grades, and has given the contract to the French Thomson-Houston Company. Each car will have 2 motors of 25-horse-power.

Gas traction will be promoted in Germany by the recently organized Deutsche Gasbahn Gesellschaft, of Dessau. The new company has ample capital, has acquired the patents on the Lüthrig gas motor, and has arranged with the Deutz Gasmotoren-fabrik, Cologne, for the manufacture of the engines.

Water power is to operate the dynamos furnishing current to the incline railway up the Jungfrau, in the Alps. The power is to be divided into two plants, one operating under a head of 115 feet and a lower one operating under 220 feet head of water. The upper plant will develop 1,950-horse-power and the lower over 4,000-horse-power.

Electric traction has been recommended by the tramways committee for adoption on the Leeds, Eng., municipal tramways. After an exhaustive inquiry the committee came to the conclusion that the present dual system of haulage, steam and horse power, should be abandoned; that oil, gas and compressed air are at present impracticable; and that electric traction with overhead wires is to be preferred, except in the center of the city, where a conduit system should be adopted.

Paper currency, and its heavy fluctuations, is the chief adverse circumstance affecting the business of the Buenos Ayres, South America, Tramways, say the directors in their 1894 report. The gross receipts for the year were \$700,000, a slight decrease; and the working expense, \$500,000, a considerable reduction. Equally unfortunate has been the Buenos Ayres & Belgrano Tramway, the directors of which have voluntarily reduced their fees from \$4,200 to \$2,400 per annum. The gross revenue of this company was \$212,000, and the expense, \$139,250, but dividends on even the preferred stock have been in arrears.

The London & Southwestern Railway Company is boring two tunnels under the Thames for an underground electric railway, connecting the Mansion House and Waterloo. Hitherto there has been no means of rapid transit between these two points. When the tunnels are completed trains will rush without a stop from one terminus to the other. Eventually connection will be made with the proposed Central London Electric Railway, for which Parliamentary powers have been obtained. In midstream a staging was erected as the base of operations. From the middle of the staging two cast iron cylinders were sunk, and underpinned with brickwork. From the four faces of the two tunnels which lead from the bottom of these two shafts the work is carried on day and night. The average rate of progress is 9 feet per day from each heading, and as the distance to the Mansion House is 4,650 feet, and to Waterloo, 2,606 feet, the work will be completed by December, 1896. A cylindrical cutting shield keeps pace with the excavators, being forced forward by hydraulic presses. Behind the shield iron segments are bolted together to form the tunnel, the narrow space between the earth and the segments being filled with liquid cement forced in by pumps. At three of the faces the men work under compressed air of 15 pounds pressure to prevent the entrance of water. One of the tunnels is 12 feet $1\frac{1}{2}$ inches in diameter, the other is $7\frac{1}{2}$ inches wider. Each will contain a single track electric railway, trains passing up one tunnel and returning through the other. The cost will be \$2,500,000.

HANDLING INTERURBAN FARES.

Handling interurban fares where the rates vary is not a simple task, especially if the company's pocket is to receive all the benefit to which it is entitled. Steam roads have, to a great extent, done away with the payment of cash fares on their suburban systems by compelling passengers to buy tickets before they enter the train; otherwise more than the ticket rate is collected by the conductor. This plan cannot be used by street railways, as most of them are bound by a provision of their charters to a maximum rate of fare.

George L. Brown, treasurer of the Rochester, Charlotte & Manitou Railroad Company, Rochester, N. Y.,

RECEIPT FOR CASH FARE.

14051	This Coupon is to be retained by Passenger as a receipt for payment of Fare, and is good for this trip and train only.	
	3 Cents	
	8	5 "
	5	8 "
	8	10 "
	10	13 "
13	15 "	
14051	Conductor will deliver Coupon to Passenger for amount collected, returning unused portion with cash and trip report to ticket office.	
	TRAIN.	TRIP.
	1	1
	2	2
	3	3
	4	4
	5	5
	6	6
	7	7
	8	8
	9	9
	10	10
11	11	
12	12	

Issued by Conductor

No.

tion of trip numbers enables the receiver to know the number of passengers carried each trip.

The Sandusky, Milan & Norwalk Electric Railway Company, Sandusky, O., has sent us a conductor's trip report, which is reproduced in this connection. It is 4 by 9 inches, there being seven lines reserved for remarks. All tickets handled by conductors are given out in bunches of fifty, numbered consecutively, and are in coupon form, one portion being given to the passenger and the other retained by the conductor, who turns it in with his report to the company. These tickets are on the principle of the cash fare receipt used by steam roads. Tickets sold from ticket offices are accounted for in the manner usual with steam roads.

Conductors are required to make report of all sales

sent us a sample ticket used by his company, which is here reproduced full size. The amounts noted on the coupons, as divided by the dotted lines represent the different rates of fare. If three cents is paid the conductor tears off the first coupon, which the passenger retains, as it may come useful in case of dispute. The remainder of the coupons is retained by the conductor, and when he turns in his book the small figure on the coupon shows how much he has collected. The train and trip numbers are punched. This is a simple method, which compels the conductor to give each passenger something in return for his fare, and if it is not done, the other passengers will be quick to notice it. The cancella-

and collections of tickets each trip. The company runs over some leased track, the basis of payment being a certain sum for each passenger carried.

E. S. Doud, secretary of the Lehigh Traction Company, writes that his company has divided its lines into four sections; a charge of 5 cents being made for a ride in each section. When a dividing point is reached passengers must take another car for the next section, and another 5 cent fare is collected. Pleasant Hill is the southern terminus of the line, and Freeland the northern terminus. From Pleasant Hill to Audenried the fare is 5 cents, the passenger passing through Honey Brook and Kilayres. At Audenried is the division line and another fare is collected, if he continues in the car, which entitles him to ride through Tresckow and Jeanesville to Hazleton. Here he must change cars if he desires to go further north. Another 5 cent fare is collected for a ride to Ebervale, and the passenger rides through Harleigh, Milnesville, and Lattimer. When the car leaves Ebervale the conductor collects another nickle from each rider, which will

The S. M. & N. Electric R'y Co.

TAKEN UP.		Conductor's Trip Report.	SOLD	
No.	VALUE.	For	No.	VALUE.
		189		
		Return Coupon Tickets		
		Single Coupon Tickets		
		Ticket Fares in Norwalk		
		Cash Fares in Norwalk		
		Ticket Fares on White Line		
		Cash Fares on White Line		
		School Tickets Punched		
		Family Tickets Punched		
		Nickel Plate Tickets		
		Sundries		
		Totals		

Car No. Trip No.

Starting from at

Ending at at

Conductor's Name

Motorman's Name

No. People's Coupon Sold ☒

Single Return

REMARKS:

Conductors must fill out this blank and return same to office of the Company at Sandusky immediately upon their arrival each trip, returning all tickets taken up during the trip. All cash must be returned for a preceding day on arrival first trip in morning, together with trip sheet and tickets taken up on last trip the previous night. Blanks must be neatly filled out and properly dated.

carry him through Oakdale, Japan, Jeddo, and Drifton to Freeland, the northern terminus of the line.

Speaking of this system of handling fares Mr. Doud writes: "Our conditions permit this being done nicely;

as our passengers are separated so distinctly, and there is actually no travel upon the cars from one point in a suburban town to another in the same town, except in Hazleton. The people do not use the cars unless going from one town to another."

STREET RAILWAYS IN PARIS.

Street railways were first introduced into France by Alphonse Loubat, who had observed their advantages in a visit to the United States. An experimental line having proved successful, Mr. Loubat, in 1854, was granted a franchise for a horse railway between Sevres and Vincennes. Two years later his privileges were transferred to the General Omnibus Company, which is still in existence. For many years the street railways of Paris made but slow progress; since 1873 their advance has been very rapid, and now the city and suburban lines cover 230 miles and carry each year 160,000,000 passengers.

When a franchise has been applied for, a commission is appointed to examine into it and determine the privileges and obligations of the concessionaire. Franchises may be granted by the Minister of Public Works, representing the State; the Council General, representing the Department; or the Municipal Council, representing the Commune; but the latter cannot do so without the approval of the Prefect. Nearly all of the concessions will expire May 31, 1910, when the omnibus monopoly also ends.

Taxes are not burdensome. The city receives no percentage of the revenues, its income from the companies being limited to a rental of \$22,500 for space occupied by offices, stations and shelters erected on the highway; and a sum of about \$16,500 made up by a tax of a few cents on each car started from a terminus within Paris. An exception is the Belleville Cable Railway which pays \$10,000 a year to the city. Street cars are exempt from the 3 per cent wheel tax levied on vehicles by the State.

Concessionaires are required to bear a portion of the expense of keeping the roadway in repair. The speed of steam lines is limited to 12½ miles an hour. If, after inquiry, it may seem necessary for the public benefit, concession may be withdrawn at any moment. When a concession expires the government may, if it so desires, purchase it under certain terms based on the average revenue for a certain period. The government may also purchase the rolling stock and other personalty at a valuation, but cannot be compelled to do so. Should the powers that be decide that a line is not to be maintained, it must be removed and the roadway restored to its former condition at the concessionaire's expense. If the line is neglected during the last five years of a concession the revenues may be seized and used to make repairs.

Fares are fixed at 30 centimes (5.7 cents) first-class, and 15 centimes second-class, except on the Belleville Cable Road where the maximum fare is 10 centimes through the day and 5 centimes (1 cent) during the hours when workmen ride, but this cable road is only 2 kilometers (1¼ miles) in length. First-class passengers ride

inside, second-class on top. Passengers who have paid first-class fare are entitled to "correspondence" (transfer) over any line in the city. On suburban lines the fares vary, but are fixed when the concession is granted. Every five years the administration revises the fares.

Many of the lines continue to be operated by animal power. One company uses compressed air exclusively. One line is worked by cable, one by locomotives and several by steam and electric motors.

In a state where high taxes are levied on all possible sources to defray the expenses of public works and maintain a great standing army, it seems remarkable that the street railways should have escaped.

ACTION OF THE SOIL ON IRON POLES, PIPES AND CEDAR POLES.

G. S. W. in the *Technic*, (the annual of the Engineering Society of the University of Michigan) gives some points on the rusting of iron poles and the rotting of wooden ones, that may be of value to our readers. He says:—

"Experiments with ordinary four-inch gas pipe used as trolley poles, and set in concrete up to the surface of the ground, without other coating, developed that they would become corroded through, at about ten inches below the surface in about three years, forming a black deposit. The life of white cedar poles in the clay soil of Detroit is said to be about thirteen years, without protection or treatment of the butts. Norway pine poles have lasted in the same soil about thirty years, but were badly rotted at the surface line. They, however, rot very soon in a sandy soil. The more pitchy ones decay first. Winter cut poles and those cut in summer with the sapwood removed are more lasting than those containing green sapwood. In a sandy soil frost has gone so deep as to render inoperative the ground plates of a fire alarm telegraph, which were buried five feet deep, while the same plates in similar locations in the same town, but in clay, were not affected. In Detroit the experience of the fire department with hydrants shows that sand heaves from frost more than clay does. It is reported that steam piping covered with a non-conductor and maintained at a temperature from 250° to 300° Fahrenheit, though buried in the ground, will not corrode, while a hot water return at 212° Fahrenheit, similarly covered and buried would corrode from the outside by rusting. In the course of some construction, recently, it was found necessary to tear out and rebuild some man-holes in the streets, that had been standing about six months; and it was then noticed that in concrete, made of the same material in the same proportions, there was no appreciable difference in the strength, as regards the resistance to breaking up, and taking out, between those cases where the material had been thoroughly rammed in place, moistened only, so that the moisture just gathered on the surface, and those where it was slushed in very soft and allowed to set under water."

STREET RAILWAY LAW.

EDITED BY FRANK HUMBOLDT CLARK, ATTORNEY AT LAW, CHICAGO.

Repeal of Street Railway Ordinance.

A legislative grant accepted by the grantee constitutes a contract, the terms of which cannot be altered without the mutual consent of the parties, except as the right to repeal or alter is reserved in the enactment itself or existed in constitutional or legislative provisions; and an impairment of such a contract by the legislature or by a municipality authorized by it, or acting under a statute supposed to give the power, is a violation of the provision of the Constitution of the United States relating to the impairment of contracts.

The Court said in part:

I now come to the consideration of Ordinance No. 23. Did its enactment and acceptance constitute a contract of the character claimed by the plaintiff, and, if so, has such contract been impaired by the repealing ordinance of November 18, 1892? These questions are to be answered as the law is found to be applicable to the facts I have stated. The defendant insists that Ordinance No. 23 was a mere license to the railroad company to use the streets designated in it for railroad purposes, subject to modification or repeal at the will of the municipal authorities of the city of Baltimore; also, that the court of appeals of the state of Maryland, prior to the passage of said ordinance, had decided that the mayor and city council of the city of Baltimore could not pass an irrepealable ordinance, which decision, it is claimed, under the rules of construction relating to such matters, became part of the city's agreement with the railroad company. In support of this contention the cases of *Rittenhouse v. Mayer*, etc., 25 Md. 337, and *State v. Graves*, 19 Md. 351, are cited. I have examined them carefully, considering the facts in each in connection with the opinions of the court relating thereto; and I am convinced that it was not the intention of the court of appeals to hold as the defendant here claims, but that it really designed to and did announce the now well-established doctrine that municipal corporations, so far as their own internal affairs are concerned—such as opening, closing, and grading streets, or constructing buildings for public use in a particular manner, or at a certain place—can pass no irrepealable ordinance. The court in those cases did not regard the ordinances as contracts, but considered them municipal enactments or regulations, repealable at the pleasure of the city, as the public interest might demand.

It may be admitted that, as the general railway act of the state of Maryland was passed after the adoption by the people of that state of the constitution of 1867, the right is reserved to the general assembly to repeal, alter, or amend the charters of the North Avenue Railroad Company, and of the Lake Roland Elevated Railway Company; and also it may be conceded that if the general assembly of Maryland had repealed the ordinance relative to double tracks upon Lexington street, or authorized the mayor and city council of Baltimore to do so, then there would be no impairment of the obligation of the contract relied on in this case, and that the plaintiff would not be entitled to the relief sought. It is certainly

true that the general assembly has not directly legislated relative to the modification of the repeal of said Ordinance No. 23. The question next to be answered is, has the mayor and city council, under the authority of the general assembly, done so? That the municipal authorities of the city of Baltimore, in passing the repealing ordinance, acted under supposed legislative authority, and not in the exercise of a right under their general powers to repeal a mere license or rule of regulation, is, I think, clear. That they have not the right, under their general powers, to repeal an ordinance passed by them, by which a contract has been created, is also clear; and as their only legislative grant of powers to repeal limits such action, so far as Ordinance No. 23 is concerned, to their general powers, it is quite evident that the authority under which they acted in passing Ordinance No. 1 was supposed, and not real. I cannot agree with counsel for defendant that authority can be found in chapter 370, Acts 1890, and in chapter 112, Acts 1892, General Assembly of the State of Maryland, giving the mayor and city council of Baltimore the power to amend or repeal Ordinance No. 23; but after hearing their arguments, and reading the opinion of the city solicitor relative to their power under said legislation (a copy of which is found in the record of this cause), I can readily understand why the municipal authorities of that city supposed that they had power from the general assembly to pursue the course they did. It is true that by the Acts of 1890 (chapter 270) it is provided that the mayor and city council of Baltimore shall have power to regulate the use of the streets, lanes and alleys in that city, by railway or other tracks, gas or other pipes, telegraph, telephone, electric light, or other wires and poles, in, under, over, or upon the same; but except in regard to underground conduits for wires, for which purpose it seems to have been enacted, I do not find that it gives any additional authority to said officials, so far as the use of the streets of Baltimore and the regulation of the same are concerned. It has been conceded for years—long recognized as the law—that the mayor and city council of Baltimore have full control over the streets and highways of that city, and the act of 1890 has been held to be an “amplification of their general power over, and right and duty to regulate and maintain the streets and highways of the city for the use of the public.” The general railway act of 1876 gave the municipal corporation of Baltimore the general power to consent or to refuse assent to the use of its streets by railroad tracks, and, independent of this, it has been held for years that such municipalities have that general power without the direct authority of the legislature, so far as local or street railways are concerned.

(Dill. Mun. Corp, (4th ed.) § 724; *Hinchman, v. Railroad Co.*, 17 N. J. Eq. 75; *Jersey City & B. R. Co. v. Jersey City & H. R. Co.*, 20 N. J. Eq. 69; *Atchison*

St. Ry. Co. v. Missouri Pac. Ry. Co., 31 Kan. 661; Brown v. Duplessis, 14 La. Ann. 842; State v. Corrigan Consol. St. Ry. Co., 85 Mo. 263.)

The rule of construction, with respect to legislative grants to corporations, relied on by the defendant, may be conceded,—“that only such powers and rights can be exercised under them as are clearly comprehended within the words of the act, or derived therefrom by necessary implication, regard being had to the objects of the grant. Any ambiguity or doubt arising out of the terms used by the legislature must be resolved in favor of the public.”

(Minturn v Larue, 23 How. 435; Barnett v. Denison, 145 U. S. 135; Hamilton Gaslight & Coke Co. v. Hamilton City, 146 U. S. 258, 13 Sup. Ct. 90; Fertilizing Co. v. Hyde Park, 97 U. S. 659.)

Did chapter 112, Acts 1892, to which I have already alluded, and to which, in connection with the rules and authorities just cited, I will again refer, justify the repeal of Ordinance No. 23? So far as it relates to the right to repeal, does it give to the defendant any power additional to that possessed by the city authorities before its passage? It seems to me that it does not, so plainly so that it is rather strange it should be seriously contended to the contrary. What right to amend, alter or repeal, did the city possess, under its “general powers,” prior to the date of said enactment? In this case it has just such right, and no more, as it reserved in Ordinance No. 23. The general assembly, by said chapter 112, did not intend to reserve to the city authorities any additional or absolute right of amendment or repeal, but is careful to limit them to the “same power and control” as they would have under their “general powers.” If an ordinance passed by them does not constitute a contract, but simply relates to affairs as to which the city alone is interested, then, under their general powers, their right to amend or repeal it is without limit. If a contract has been created by the ordinance, then the right to amend or repeal is such as was reserved to the city in the enactment itself. The only clause in Ordinance No. 23 providing for changes in or amendments to it is in the following words: “And shall be subject to all the general regulations now existing or hereafter to be made, relating to city passenger railways not inconsistent with this ordinance.” I do not find the right to repeal in this reservation, but simply the right to regulate, provided that the regulations proposed are not inconsistent with the terms of the ordinance.

(United States Circuit Court, District of Maryland. Baltimore Trust and Guaranty Co. vs. Baltimore 64, Federal Reporter 153.)

[For contrary opinion see Lake Roland Elevated Railway Co. vs. Baltimore 77 Md. 352; 54 American and English Railroad cases 11. Ed.]

Enjoining Construction of Street Railway—Suit by Abutting Owner—Attorney General the Proper Party.

The first question for consideration upon this appeal is whether a court of equity will in the case presented by

appellant's bill interfere at the suit of an owner of abutting property to restrain the use, for public purposes, of a street by a private corporation.

The question really is whether an abutting owner has such a private right, vested interest, in the use to which a public street may be put that he is entitled to have such private right and interest respected, and protected by the people's writ of injunction.

It is manifest that if the abutting owner is entitled to enjoin the use of a public street it is because of his private right; he can not assume to, because he does not, represent the public. The attorney general is the only proper representative of the public and in suitable cases bills may be by him maintained to protect the public interests:

(Kerfoot v. The People, 51 Ill. App. 409; Attorney General v. The Newberry Library, 51 Ill. App. 166; Same v. Same, 150 Ill. 229; Hunt v. Chicago Horse & Dummy Ry. Co., 121 Ill. 638.)

If one abutting property owner may, for such an injury to the public, file a bill and obtain an injunction, then each of such owners may do likewise.

Mr. A, the owner of a lot, obtains upon his bill an injunction against the contemplated use. His bill is answered, testimony is taken, upon hearing, the evidence being contained is found not to sustain the allegations of the bill, whereupon it is dismissed. Mr. B immediately files his bill, the allegations being the same as those in that of Mr. A with the necessary variation as to the description of the lot of which B is the owner. If the bill of A presented a case for an injunction, the bill of B does; it is no answer to say that the court has found the allegations in the bill of A to be untrue; Mr. B was not a party to that suit, he is not bound by the conclusions there reached; he is entitled to be heard upon the charges by him made; he well urges that it by no means follows that he may not establish the truth of allegations which A failed to prove; and that the rights of B can not be foreclosed by a suit brought and prosecuted by A.

The court can not be a respecter of persons, and to be consistent, must give B an injunction and hear his cause. The second suit results like the first; whereupon C files his bill demanding an injunction upon a hearing. How can he be denied? In brief, if one abutting owner is entitled to, by injunction, maintain the public right, why is not each successively?

If appellant may upon his bill obtain an injunction restraining the use of the street by appellee, why may not another abutting property owner in another and proper proceeding, obtain an order compelling appellee to comply with its contract with the public, by placing rails upon and running cars for the carriage of passengers along the streets.

The difficulty with proceedings at the suit of individual owners of abutting property, to either restrain or compel the use of a public street for a particular purpose, is that such suit concludes no one but the parties to it. The very decree and restraining order appellant seeks, he might, for a selfish and personal consideration, release; he

can establish only his property right, and that he may barter in any lawful way.

For these and other reasons it is well established that the attorney general is the proper party to represent the public, and a bill will not lie at the instance of an individual to restrain the doing of that from which the complainant will suffer no damage other than that which the public sustain.

The abutting property owners do not, in this as in some other States, own the fee of the street. The street is held by the public authorities in trust for the use of the public. The abutting owner has therefrom a right of access to his property, a right to the light and air that naturally come to his premises from the public way, but to the use of or to control the use to which the street may be put, he has no more right than any of the other millions for whose convenience the highway exists. If by reason of the taking of the street for a new public use his property is specially damaged, he is entitled to recover such damage in an action at law. To one who desires, at his home, quiet and peace, it may be annoying that thousands should pass his door in noisy omnibuses or crowded cars. The right, however, to say who shall ride or walk past his door does not belong to him. The street is for the use of the public, of which he is but one.

(Appellate Court of Illinois, *Stewart vs. Chicago General Street Railway Co.* 27 Chicago Legal News 303.)

[See also *North Chicago Street Railroad Co. vs. Chatham* 27 Chicago Legal News 306. Ed.]

NOVEL TRANSFER TICKET.

The fast increasing adoption of transfer tickets throughout the country has stimulated a study of improved

systems and tickets, by means of which the passenger could be individually transferred, and at the same time the company protected to the fullest extent possible. The check illustrated herewith is the invention of Charles S. Smith, Spokane, Wash. The hour and minute limit is practically the same as in the Green transfer, illustrated in the REVIEW in September 1892. The line to which the passenger is destined is indicated by tearing along the printed line bearing name of route. The time, by tearing off as much of

12	A M
1	
2	
3	15
4	30
5	45
6	P M
7	0
8	15
9	30
10	45
11	

the lower portion of ticket as will leave the hour and minute desired. A small brass strip is used in tearing, thus doing away with the necessity for a punch; or a punch can be used instead if preferred.

THREE OF A KIND.

The president of a western road was seated on one of his cars with his mind on some business problem. The conductor asked for fare, but the president did not hear him. Putting his hand on the passenger's shoulder he gave it a vigorous shake. The president being brought back to earth, saw the blue uniform, felt for his book of tickets, and not having it at hand said, "I refuse to pay another assessment on this property."

Samuel W. Allerton, the gossips say, was applied to for a loan by a certain street railway company. He visited the town, looked over the system, and was entertained by the directors. He promised to give his decision in a few days after he had returned home. Mr. Allerton was kept busy after his return, and among other things his machinery greases which are proving so popular with street railway men for electric cars and power house plants, requiring a great deal of his time. The directors got anxious and sent up a committee, which was granted an audience. Mr. Allerton turned to a companion and said:

"You ought to see that electric car line. It is splendidly equipped. (The committee looked pleased.) Pullman gives his customers pretty fair service, but he isn't in it with that street car company. ('We've got him,' thought the visitors.)"

"How is that," asked his friend.

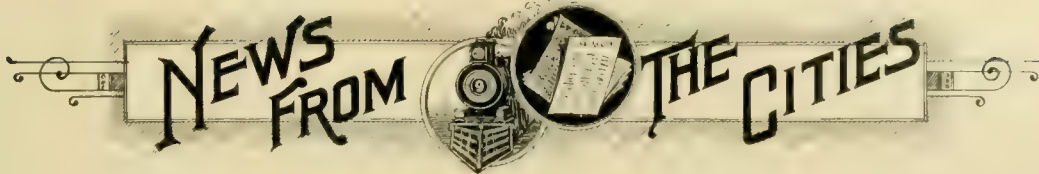
"Why, the best you can get from Pullman is a state room for \$15, but down in this town you can get a whole car to yourself for 5 cents."

The railway men withdrew asking themselves why, on the day of Mr. Allerton's visit, they did not hire enough people to ride to make a traffic showing.

When Russell Sage got through his luncheon in the Western Union building the other afternoon he got on a cable car to ride to his office. G. P. Morosini saw him alight and he rushed up and exclaimed with mock seriousness: "This won't do! I'd like to know how you came to ride on the Broadway road and take business away from the elevated road?" "Oh," said Mr. Sage, with the wink peculiar to him when his sense of humor is aroused, "another fellow paid my fare."

CASH RECEIVER SHOT AND ROBBED.

While checking up his accounts for the day, Carey B. Birch, cash receiver of the West Chicago Street Railroad at the Armitage avenue barns, two hours after midnight, June 23, was surprised by a masked robber, who ordered him to throw up his hands or die. Instead of complying Birch reached for his gun and fired one shot which went wide of the mark, the robber having already fired twice. As Birch sank to the floor the desperado again shot twice, all four bullets taking effect. Seizing a handful of currency, less than \$200, the murderer unseen, made his escape. Birch died four hours later. A reward of \$5,000 has been offered for the murderer by the West Chicago Company.



Arkansas.

LITTLE ROCK, ARK.—J. B. Healy has been granted the street railway franchises for which he applied some time ago.

LITTLE ROCK, ARK.—The Boulevard Street Railway Company will build 3½ miles of electric line. Those interested are J. H. Healey, W. S. McKain, E. W. Kimball and P. W. Crawford.

Arizona.

FLAGSTAFF, A. T.—The Peru River & Los Angeles Electric Power Company has been incorporated with \$5,000,000 capital, by J. W. Eddy, L. J. C. Spuance, P. J. Beveridge, John Cross, E. H. Brooks, W. H. Davis, Ozro W. Childs, E. H. Janes, E. H. Gale, H. S. McKee.

California.

SANTA MARIA, CAL.—The Fowler Canyon Electric Railway Company has been granted a franchise.

OAKLAND, CAL.—E. P. Vandercook has petitioned for a franchise for an electric railway to Livermore.

NAPA, CAL.—L. Grothwell has been granted a franchise for an electric road from Napa asylum to Calistoga and to run telegraph and telephone lines.

LOS ANGELES, CAL.—The Los Angeles Consolidated Railroad will be sold August 15, and will probably be bid in by the bondholders. Considerable construction will be done after the sale.

SAN FRANCISCO, CAL.—The Pressley Single-Track Electric Railway Company has been incorporated with \$500,000 capital, by L. C. Pressley, J. C. Rhoades, J. O. Jephson, C. S. Wheaton, W. F. Olding.

Canada

SHERBROOKE, QUE.—The Danville council has granted a franchise for an electric railway and a cash bonus of \$5,000 to Greenshields & Bros.

QUEBEC, QUE.—The Quebec, Montmorency & Charlevoix Electric Railway Company has been granted an electric street railway franchise.

WINNIPEG, MAN.—The Winnipeg Electric Street Railway Company will remodel its power house, installing new and larger engine and generators.

GUELPH, ONT.—George Sleeman has closed a contract with the Canadian General Electric Company for the entire electrical equipment of the Guelph Electric Railway Company.

OTTAWA, ONT.—General Riley, consul general and James Fowler, U. S. consul, Carleton Place, Ont., are interested in a proposed electric road 20 miles long, from St. Remi to Napierville.

OTTAWA, ONT.—The International Railway Company, electric, has been incorporated, with headquarters at Hamilton. The company is authorized to bond the road for \$20,000 for each mile of single track, and \$6,000 additional per mile of double track.

Chicago.

CHICAGO, ILL.—The Empire Light & Power Company has increased its capital to \$50,000.

CHICAGO.—S. R. Ainslee, general manager of the Chicago & Northern Pacific Railroad has decided to equip the suburban lines for electric traction.

CHICAGO.—Stockholders have completed financial arrangements and work on the Northwestern Elevated Railroad will be pushed.

CHICAGO.—The Chicago Electric Street Railway Company has been incorporated with \$5,000,000 capital, by Sherman D. Purnia, John Parrott and O. W. Larson.

CHICAGO.—The Chicago City Railway Company has ordinances pending in the city council for adopting electric traction on all of its horse lines, and constructing additional lines.

CHICAGO.—The Electric Railway Construction & Manufacturing Company has been incorporated with \$250,000 capital, by John W. Jones, William Riley and Sterling P. Bailey.

CHICAGO.—The Western Compressed Air Traction & Construction Company has been incorporated with \$500,000 capital, by Ralph R. Bradley, William M. Fletcher and Frank F. Pratt.

CHICAGO.—The Goam Electric Company has been incorporated, with \$10,000,000 capital, to manufacture electrical apparatus, by Basset Cadwallader, Charles O. Barnes, Nahum E. Jamieson.

CHICAGO.—The Winchester Construction Company has been incorporated to build railways; capital, \$500,000; incorporators, George W. Waterman, William R. Odell and William W. Case.

CHICAGO.—The Elliott Magnetic Electric Company has been incorporated with \$1,000,000 capital, to manufacture electrical appliances, by William R. Ellis, Isaac G. Robbins, Charles G. Edmons.

CHICAGO.—The Metropolitan Traction Company has been incorporated with \$10,000,000 capital to manufacture appliances for street railways, etc., by Fred Loas, Henry F. Keene, William Grotte.

CHICAGO, ILL.—The Chicago City Street Railway Company has been incorporated to build and maintain horse and dummy lines. Capital \$5,000,000; incorporators, A. C. Scott, A. J. Hawks, T. C. Kane.

CHICAGO.—The city council committee has approved the application of the Chicago City Railway Company for permission to adopt electric traction on all of its horse lines and to construct several new lines.

CHICAGO.—Badt's Multiphase Electric Railway Company has been incorporated to build and operate an electric railway under the Badt patents. Capital, \$1,000,000; incorporators, William A. Aylesworth, James C. Essick, Adolph Gray.

CHICAGO.—The Chicago & Western Electric Street Railway Company has been incorporated with \$5,000,000 capital to build an electric line from West 48th street through Cicero and Proviso, by H. D. Beam, Maier Rosenthal and H. W. Cooke.

CHICAGO.—The Central Elevated Railroad Company has been incorporated with \$7,500,000 capital, by Robert D. Sheppard, E. Hamilton Hunt, Dwight Lawrence, Seneca D. Kimbark, F. F. Donnel, to build an elevated loop line in the down town district.

CHICAGO.—The Lake Street L Road has contracted with the General Electric Company for 25 motor equipments of 125-horse power each. New trucks will be required and a third rail will be laid. The company will expend \$225,000. Deliveries are to be made within 60 days.

CHICAGO.—The Chicago Passenger Traction Company has been granted a franchise for an electric line in Fullerton avenue, from Milwaukee avenue to the city limits, and in Tanner road from Bryn Mawr avenue to the city limits. Judge Gibbons is said to be interested in the road.

Colorado.

DENVER, COL.—The Denver City Cable Railway Company has been ordered sold at foreclosure. The debt is \$5,662,142.07. The company will be reorganized.

Connecticut.

NEW HAVEN, CONN.—The Centerville Electric Railway will extend. No contracts have been let.

NEW HAVEN, CONN.—The Manufacturers' Street Railway Company, recently incorporated, has applied for a franchise for a single track exclusive freight line.

GILDERSLEEVE, CONN.—S. Gildersleeve writes that plans and specifications for constructing the Portland Street Railway, eight miles, will soon be ready for bids.

GILDERSLEEVE, CONN.—The Portland Street Railway Company held an organization meeting at the store of S. Gildersleeve & Sons. Charles S. Cox, Boston, will probably superintend the construction.

STAFFORD, CONN.—A trolley line is to be built to Rockville by W. B. Ferguson, Malden; Charles C. Davison, Leominster, Mass.; R. S. Hicks, Stafford Springs; C. E. Dana, Plymouth; A. L. Patten, Leominster; H. L. Pierce, Plymouth, and F. E. Lowe, Greenfield.

STAFFORD SPRINGS, CONN.—The Rockville, Stafford & Southbridge Electric Railroad Company, has been organized with William B. Ferguson, Malden, Mass., president; Charles C. Davison, Lewiston, Me., treasurer; R. S. Hicks, Stafford Springs, secretary; directors, Charles E. Bana, Plymouth, Mass.; A. L. Patten, Lewiston, Me.; F. E. Low, Greenfield, Mass.

Delaware.

DOVER, DEL.—The Dover & Milford Railway Company has been granted a franchise for an electric railway. W. T. Watson, Milford, is president and John D. Hawkins, Dover, secretary.

District of Columbia.

WASHINGTON, D. C.—The Eckington & Soldiers' Home and the Belt Railway Company have been sold to the Washington & Baltimore Boulevard Company.

WASHINGTON, D. C.—The Washington & Great Falls Electric Railway Company has sold \$100,000 bonds to Stilson Hutchins and contracts for construction will be let without delay. J. P. Clark has been elected president; S. T. G. Morsell, vice-president; Lee Hutchins, treasurer, and W. E. Lewis, secretary.

Georgia.

ATLANTA, GA.—The Atlanta Traction Company has been reorganized as the Atlanta Railway Company, with \$300,000 capital. George W. Parrott is president; Martin F. Amorous, vice president; W. C. Shaw, Alex. King, Luther Z. Rosser, L. Warfield, Sol Haas, directors. The line will be overhauled and extended and new cars purchased.

Illinois.

EAST ST. LOUIS, ILL.—The Hollow Universal Brake Beam Company has been incorporated to manufacture railway appliances. Capital \$500,000; incorporators, James F. Agler, Fred W. Sultan, Sanford Northrup.

PEORIA, ILL.—It is reported that Columbus R. Cummings has bought the holdings of Elliott Collender and Sumner A. Clarke in the Central Railway Company.

PEORIA, ILL.—The Peoria & Ft. Clark Street Railroad Company has been incorporated to operate an electric line. Capital \$150,000. Incorporators, William Burry, Charles S. Williston and Emory D. Frazer.

MILFORD, ILL.—The Milford Electric Railway is being organized to build to Boswell, Ind.

MOLINE, ILL.—Samuels & Chapman have petitioned for an electric franchise from the terminus of the Central Street Railway Company at Prospect Park to Rock river bridge.

ALTON, ILL.—The Alton Improvement Association and the Upper Alton Horse Railway Company have sold their lines to the Alton Electric Street Railroad Company for \$100,000. The North Alton line will be rebuilt.

BELLEVILLE, ILL.—The St. Louis, Belleville & Southern Railroad Company has elected John A. Day, president; George Gauss, secretary and treasurer; William James, superintendent.

FREEPORT, ILL.—The South Freeport & Cedarville Electric Railway Company has been incorporated with \$100,000 capital, by A. Bergman, Henry Lichtenberger, A. Baumgartner.

PONTIAC, ILL.—The Pontiac Transit Company has been incorporated with \$100,000 capital to construct a street railway, by C. C. Strawn, I. F. Funk and L. F. Strawn.

ALTON, ILL.—The Alton Railway & Illuminating Company has been incorporated with \$250,000 capital by J. F. Porter, C. W. Milnor, H. R. Phinney. The company will absorb the Alton Electric Railway Company, Alton Improvement Association and Alton & Upper Alton Horse Railroad & Carrying Company.

Indiana.

LOGANSPORT, IND.—David D. Fickle has been appointed receiver of the Logansport Street Railway Company.

LOGANSPORT, IND.—N. O. Ross and George B. Forgy have petitioned for an electric railway franchise from Peru to Mexico.

KOKOMO, IND.—Snow & Avery will receive bids August 1 for grading and track laying for ten miles of electric road to Greentown.

HAMMOND, IND.—The Hammond & Blue Island Railway Company has been incorporated with \$80,000 capital to build an electric line.

ANDERSON, IND.—The Indianapolis, Anderson & Marion Railway Company has recorded a trust deed for \$500,000 in favor of the Farmers Loan & Trust Company, New York.

FT. WAYNE, IND.—C. E. Everett took a party consisting of Mayor Oakley, J. B. Harper and R. G. Thompson to Larimore and Blue Lakes to look over the route of a proposed electric road.

CROWN POINT, IND.—A syndicate of Chicago, Hammond and Crown Point capitalists is reported to be about to build 42 miles of electric road, connecting Hammond, Crown Point, St. Johns, Dyer, Cedar Lake and Lowell.

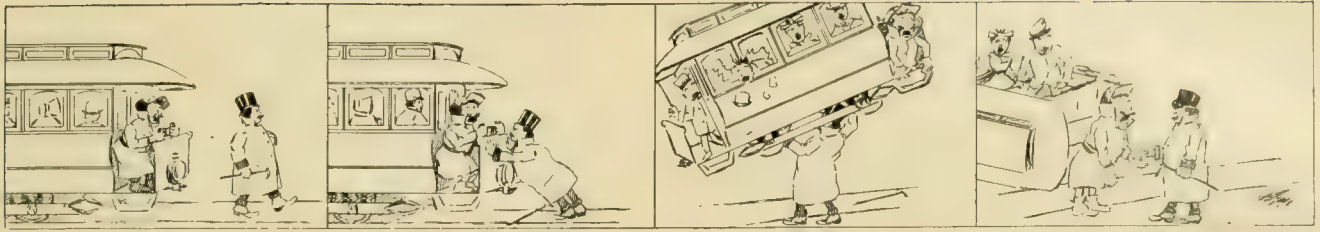
GREENSBURGH, IND.—The construction of an electric railroad between Greensburgh and Clarksville by way of Kingston is proposed by B. S. Sutton, K. M. Hord, Jacob Emmet, T. H. Stevenson, and others interested in the Oldenburg & Batesville Electric Railroad.

NEW ALBANY, IND.—Bondholders have foreclosed the first mortgage of \$50,000 on the New Albany Highland Railway Company, electric, which for a year has been operated by Receiver E. B. Stotsenburg, and the road will be sold by W. W. Tuley, master in chancery.

BATESVILLE, IND.—The Batesville & Oldenburg Railroad & Electric Company has been granted a franchise. Work will begin in 60 days on the section between Batesville and Oldenburg, and afterward will be extended to Osgood, 16 miles south. B. S. Sutton is president.

TERRE HAUTE, IND.—George H. Montgomery, P. O. box 131, has completed surveys for the Terre Haute & Brazil Electric Railway. Construction will begin as soon as contracts are awarded. Mr. Montgomery desires to get into correspondence for machinery, materials, rails, etc.

LOGANSPORT, IND.—Mrs. Katherine Deer has asked for a receiver for the Logansport Street Railway Company. She secured a judgment for \$8,000 for personal injuries. Subsequently the company confessed judgment for \$8,000 in favor of a New York bank, and Mrs. Deer alleges that it would prevent her from obtaining the amount of her judgment.



HOW THE STRONG MAN AVOIDED A COLLISION.

BATESVILLE, IND.—The Batesville & Oldenburg Railroad & Electric Co. has been incorporated to build an electric line from Oldenburg, Franklin county, to Batesville, Ripley county, a distance of a little more than 3 miles. Capital, \$50,000; incorporators, Kendall M. Hord, Bellamy S. Sutton, Edward K. Adams, John A. Tindall, Jonas Joseph, of Shelbyville; John Hildebrand, of Batesville, and Augustus A. Harkman, of Oldenburg.

Iowa.

FT. MADISON, IA.—It is probable that the Ft. Madison Street Railway Company will adopt electric traction.

FT. MADISON, IA.—The Fort Madison Street Railway Company has been granted permission to adopt electric traction, and must equip its lines before July 1, 1896, or forfeit a bond.

MASON CITY, IA.—The Mason City Electric Light Company has been reorganized with Mrs. M. I. Clark, president; T. S. Roberts, secretary and treasurer; W. P. Fitch, manager. An electric railway will be constructed.

FORT DODGE, IA.—The Fort Dodge Electric Light & Power Company, which owns the franchise for the conversion of the horse line to electricity, may also extend the road to "Wild Cat Cave," 7 miles north, and make it a summer resort.

Kansas.

WINFIELD, KAN.—Compton & Lawrence have leased the Union street car line for two years.

ATCHISON, KAN.—The Atchison Railway, Light & Power Company, with \$200,000 capital, a new company, has bought the street railway and lighting interests. The officers are R. L. Pease, president; C. M. Rathburn, vice president; R. B. Morris, treasurer; J. W. Orr, secretary. J. A. Bendure will remain as superintendent.

Kentucky.

BOWLING GREEN, KY.—C. H. Williams, Atlanta, has charge of changing to electric the Park City Railway Company.

LOUISVILLE, KY.—W. F. Carrithers, F. O. Carrithers, Lafe DeWitt, J. G. Queen, W. P. Stalliger and J. C. Wright, are interested in a project to build an electric road along the Bardstown pike from Saxony to Fern Grove Creek, Fairmount, Mt. Washington, High Grove and Fairfield.

Louisiana.

LAKE CHARLES, LA.—The Lake Charles Street Railway Company has increased its capital to \$15,000, and will extend the line.

NEW ORLEANS, LA.—Moss & Gerdes have applied for an electric railway franchise from New Carrollton to East End. Benjamin T. Waldo has applied for an electric railway franchise from Upperline street to Kennerville.

NEW ORLEANS, LA.—The interests of the family of E. J. Hart in the Canal & Claiborne Street Railroad Company have been sold. The company has been reorganized with Joseph H. DeGrange, president; B. J. DeGrange, secretary; directors, J. W. Castle, president. Hibernia National Bank; Harris Hyman, Hyman, Hiller & Co.; J. K. Newman, J. A. West, L. Fabacher, Joseph H. DeGrange, B. J. Montgomery.

Maryland.

SNOW HILL, MD.—It is reported that the Sinepuxent Beach Company is preparing plans for an electric road, 6 miles long, to be built along the beach.

BALTIMORE, MD.—Those interested in the Baltimore and Washington boulevard electric railway propose to purchase the Catonsville Short Line Steam Railroad and convert to electricity.

BALTIMORE, MD.—G. A. Meeter, W. H. Crim, S. J. Carr and W. F. Porter are forming a company, with \$75,000 capital, to build an electric railway to connect Mt. Winans, Westport, Lansdowne and Meeter's Park.

BALTIMORE, MD.—The Columbia & Maryland Railway Company, Catonsville, Md., has elected Thomas M. Lanahan, president; B. N. Baker, vice-president; Ernest McElroy, treasurer; R. Stanley Carswell, secretary; W. Kelsey Schoepf, general manager. The capital stock will be \$4,000,000 and the limit of bonds, \$6,000,000. The company has acquired the Belt Railway Company, and Eckington & Soldiers' Home Railroad Company, Washington; Baltimore & Washington Turnpike & Tramway Company, Maryland & Washington Railway Company, Edmonson Avenue, Catonsville & Ellicott City Electric Railway Company. The franchises of these companies give it the right of way from Baltimore to Washington.

Massachusetts.

SPENCER, MASS.—The Warren, Brookfield & Spencer Street Railway Company has been granted a franchise.

WESTFIELD, MASS.—The Woronoco Street Railway Company has increased its capital to \$30,000, to change from horse to electric or compressed air power.

COTTAGE CITY, MASS.—Josiah Quincy, Jr., Boston, is endeavoring to secure right of way for a belt line 7 miles long, on the northeast end of Martha's Vineyard.

MILFORD, MASS.—Charles W. Shippee announces that he has secured sufficient capital to build 12 miles of electric street railway to Holliston and South Framingham.

EAST WEYMOUTH, MASS.—The Quincy & Boston Street Railway Company will build a brick and stone building 125 x 85 feet to be used as car house, repair shop and supplemental power house.

HINGHAM, MASS.—The stockholders of the Hingham Street Railway Company have voted to sell out to the Braintree & Weymouth Street Railway Company for \$5,000 bonus and expenses incurred by the Hingham Company, and construction will begin at once.

BOSTON, MASS.—Samuel Little, president of the West End Street Railway Company, will receive bids until noon, June 28, for the erection of a brick power house complete, with stack and foundations, excluding roof. It will be known as the Charlestown power station.

WEST ROXBURY, MASS.—The West Roxbury & Roslindale Electric Street Railway Company has elected Clifford Devens, president; William P. Whittemore, clerk and Treasurer; T. H. Dunham, J. Halstrick, Charles H. Wise, George J. Morse, Charles G. Davis, directors.

BOSTON, MASS.—C. S. Sergeant, general manager of the West End Street Railway Company, will receive bids until noon, June 26, for the construction of a car house with steel frame and terra cotta walls, to be

completed by October 15, 1895, under forfeiture of \$100 a day. Bids may state price of steel frame only. Should a satisfactory proposal be received by the company, the general contractor will be expected to assume the steel proposal, if desired to do so.

WELLESLEY, MASS.—The Wellesley & Boston Street Railway Company is being organized with \$40,000 capital. The directors are Horace B. Parker, George W. Morse, Frederic Johnson, William F. Hammett, Austin R. Mitchell, James L. Richards, James W. French, all of Newton.

Michigan.

MONROE, MICH.—The Monroe Street Railway Company has been granted a franchise for an electric road. A. B. Bragdon is attorney.

MARQUETTE, MICH.—The Marquette City & Presque Isle Railway Company will extend its line 2 miles to the Hotel Superior within 30 days.

DETROIT, MICH.—The Detroit Citizens' Street Railway Company has given a \$7,000,000 blanket mortgage to the New York Security and Investment Company to cover all the company's indebtedness and to continue construction.

KALAMAZOO, MICH.—A. L. King, Nashville, Tenn., is reported to be organizing a company to build a water power electric line to Battle Creek via Gull Lake. The Yorkville Milling Company, Yorkville, owns the water power.

MT. CLEMENS, MICH.—The Mt. Clemens Street Railroad Company and the Lake Side Street Railroad Company have consolidated as the Mt. Clemens & Lake Side Traction Company, which will equip all its lines for electric traction.

GROSSE POINTE, MICH.—William J. Dawson and Eugene H. Sloman representing property owners of St. Clair Heights, have been granted a franchise for an electric railway 4 miles in length, from Jefferson to Gratiot, in the suburbs of Detroit.

DETROIT, MICH.—John H. Irvine, Strathearn Hendrie, William H. Irvine, Arthur Bassett, David Meginnity, Bryant Walker, and Byron S. Stapleton have organized a company with \$50,000 capital to build six miles of electric road to Dearborn.

Minnesota.

ST. PAUL, MINN.—It is reported that the Twin City Rapid Transit Company will change the Fourth street cable to an electric line, and use it as the beginning of a second interurban line.

Missouri.

ST. LOUIS, MO.—G. W. Baumhoff has taken the contract to build the St. Louis, Kirkwood & Meramec electric road.

ST. JOSEPH, MO.—W. A. Kellond and W. T. Van Brunt have been granted a franchise for an electric street railway.

ST. JOSEPH, MO.—The St. Joseph Traction & Lighting Company has been granted a franchise for the extension of its lines.

CAPE GIRARDEAU, MO.—J. A. Matteson bought the Cape Girardeau Street Railway Company for \$2,800. Electric traction will probably be adopted and extensions made.

ST. LOUIS, MO.—The Lindell Railway Company is preparing plans for a power house, repair shop, car shed and other buildings to occupy 14 acres of ground on Park and Vista avenues, near Grand.

ST. LOUIS, MO.—The St. Louis & Meramac River Railroad Company has increased its capital to \$750,000. The directors are Thomas Howard, J. B. Case, John A. Holmes, M. C. Orton, James P. Dawson.

KANSAS CITY, MO.—Judge Philips, of the federal court, ordered the sale at auction of the Tenth street cable line. The debts are \$600,000 first mortgage bonds, \$267,380 defaulted interest, and \$118,740 on second mortgage, total, \$986,120.

KANSAS CITY.—The final step in the consolidation of the street railway companies has been taken. Walton H. Holmes is vice-president and general manager. The company will use \$1,500,000 in improvements, relaying tracks, electrifying lines, etc.

SPRINGFIELD, MO.—The Springfield Traction Company, successor to the Metropolitan Traction Company has been incorporated with \$400,000 capital, by P. M. Hoefle, S. W. Fordyce, George W. Parker, Moses Rumsey, R. C. Kerens, St. Louis; C. B. McAfee, J. F. G. Bentley and A. J. Eisenmeyer, Springfield.

Montana.

BUTTE, MONT.—The Phoenix Electric Company has been incorporated with \$100,000 capital, by John F. Cowan, James A. Talbot, H. L. Frank, A. Whel, C. H. Smith.

New Hampshire.

DOVER, N. H.—On July 6, the Union Street Railway Company will be sold. It is believed Summer Albert or George E. Wallace, shoe manufacturers at Rochester, will purchase it. If they do, the road will probably be extended from Somersworth to Rochester.

New Jersey.

NEWARK, N. J.—The Passaic & Newark Electric Railway Company will build a power house and car barn.

MONTCLAIR, N. J.—The North Jersey Traction Company has applied for a franchise with good prospects of success.

CAMDEN, N. J.—The American Construction & Improvement Company has been incorporated with \$100,000 capital, by Crosby M. Black and George Rodgman, Chester, Pa., and S. C. Woodhull, Camden, to construct railroads, gas and electric works.

New York.

SYRACUSE, N. Y.—A franchise has been applied for by the Syracuse & Oneida Lake Railway Company.

BUFFALO, N. Y.—Jacob Busch and Thomas Murphy have applied for a franchise to supply electric light, heat and power.

NIAGARA FALLS, N. Y.—W. M. Kyle, Toronto, is promoting an international belt line. He says he has secured franchises on the Canadian side.

BROOKLYN, N. Y.—Col. A. A. Degrauw, president of the Jamaica & Hempstead Plank Road Company says he will build an electric line between Jamaica and Hempstead.

ALBANY, N. Y.—The Albany & Suburban Railway Company has been incorporated to build 12 miles of electric road to connect Greenbush, Castleton and Bath-on-the-Hudson with Albany.

LOCKPORT, N. Y.—Jesse Peterson, president of the Indurated Fibre Company, is interested in a proposed electric road to Olcott. C. A. Johnson, president of the Lock City Company, is also interested.

OGDENSBURG, N. Y.—The Ogdensburg Street Railway Company has received permission from the state railroad commission to increase its capital from \$75,000 to \$150,000, and to use the electric trolley as motive power.

STONY BROOK, N. Y.—Israel G. Hawkins will be ready for proposals July 1, to construct a bicycle road 20 miles long from Sayville to Stony Brook. He is in the market for yellow pine ties, 3-inch plank and 70-pound steel rail.

MIDDLETOWN, N. Y.—The Middletown-Goshen Traction Company, with \$400,000 capital has consolidated the old company of that name and the Middletown-Bloomington Electric Railway Company. The directors are James C. and John Hinchliffe, Paterson, N. J.; Perry H. Throop, William B. Rockwell, M. J. Wightman, Scranton, Pa.; Charles H. Smith, William B. Royce, Middletown; William S. Grant, Jr., Philadelphia.

BUFFALO, N. Y.—Surveys have been begun for the Buffalo, Gardenville & Ebenezer Railway Company. The officers are Charles L. Schoefflin, Gardenville, president; Dr E. H. Ballou, Gardenville, vice-president. Contracts will soon be let.

BROOKLYN, N. Y.—The directors of the Kings, Queens & Suffolk Company have authorized the purchase of right of way and the beginning of construction on the line to Far Rockaway. The funds for the work are said to be in hand.

NEWBURGH, N. Y.—The Newburgh Electric Railway Company which is now extending the line from Orange Lake to Walden contemplates running roads through New Windsor, Vail's Gate and Moodna to Cornwall; and through Middlehope, north to Marlborough.

LITTLE FALLS, N. Y.—The Little Falls Street Railway Company has been incorporated to build. Capital, \$75,000; directors, William H. Tylee and T. C. Bates, of Worcester, Mass.; C. L. B. Tylee, Frank H. Viele, John L. Miller, Edwin J. Carpenter, Charles M. Hyde, George E. Tylee and Morris E. Gregory, of Corning.

UTICA, N. Y.—The Utica & Herkimer Street Railway Company has been incorporated to build 3 miles of electric railway in Utica. Capital, \$30,000; incorporators, David S. Foster, George E. Dennison, William J. Kernan, Harry P. Crouse, Burt A. Rogers, E. L. Wells, John F. Shanley, Charles J. Manning and John P. Sheehan, all of Utica.

BUFFALO, N. Y.—The Buffalo, North Main Street & Tonawanda Railway Company has been incorporated to operate a road already constructed. Capital, \$50,000; incorporators, S. W. Petrie, Thomas H. Feary, J. H. Pardee, Buffalo; H. H. Crowell, Syracuse; John F. Farrell, Albany, and James O. Carr, H. M. Francis, G. C. Smedberg, S. D. Greene, H. Parsons and H. C. Levis, Schenectady.

SYRACUSE, N. Y.—The Syracuse & Suburban Railway Company has been incorporated with \$250,000 capital by John C. King, William Cowie, Osgood V. Tracy, Francis W. Gridley, Edward Joy, Arthur Jenkins, Francis B. Gill, Giles H. Stillwell, Syracuse; John F. Gaynor, A. Cady Palmer, Fayetteville; R. W. Gridley, Thousand Islands Park. The company will build an electric line from Syracuse to Fayetteville and Manlius.

GREENWICH, N. Y.—The Greenwich & Schuylerville Railroad Company has been incorporated with \$200,000 capital to build six miles of electric road from Greenwich, Washington county, to Schuylerville Saratoga county, by Watson Sprague, Robert Hamilton, Greenwich; Reeves Smith, Martin Schenck, Troy; James Mealey, James E. Kelly, Schuylerville; Alben M. Crandell, Middle Falls; Thomas W. Cantwell, William J. Wilson, Albany.

Ohio.

LORAIN, O.—The East Lorain Street Railroad Company has been incorporated with \$25,000 capital.

MT. VERNON, O.—The Central Ohio Electric Railway Company has increased its capital to \$200,000.

GALLIPOLIS, O.—Col. John L. Vance bought the Gallipolis Street Railroad at sheriff's sale for \$17,275.

CLEVELAND, O.—Attorney Amos Denison is securing right of way for 30 miles of electric line to Medina.

EAST LIVERPOOL, O.—A. R. Mackall and eastern capitalists contemplate building an electric railway to Lisbon and Salem.

FREMONT, O.—George Slessman has been appointed receiver of the Fremont Street Railway Company, in bonds of \$15,000.

TIFFIN, O.—A. Kamp has been appointed receiver of the Tiffin Electric Railway Company in place of N. W. Miller, resigned.

YOUNGSTOWN, O.—The Youngstown Park & Falls Street Railway Company has been granted an additional franchise through the city and to Mill Creek Park.

PORT CLINTON, O.—George B. Kerper says arrangements have been completed for constructing 10 miles of electric road to Ottawa.

TOLEDO, O.—Arbuckle, Ryan & Company have leased the Put-in-Bay Electric Railway Company from L. S. Baumgardner, receiver.

TIFFIN, O.—The Tiffin & Fostoria Electric Railway was sold June 10, by the sheriff, for \$19,784 to the Interurban Rapid Transit Company.

GALLIPOLIS, O.—John L. Vance, who bought the Gallipolis Electric Railway Company, is reported to be in the market for cars, rails and wire.

YOUNGSTOWN, O.—Noble & Co., Cleveland, have the contract for building the Mahoning Valley Electric line from Brier Hill to Niles, 7 miles, for \$42,000.

WADSWORTH, O.—Thomas Walsh, of the Walsh-Babcock Street Railway Company will extend his line around Crystal lake near Silver lake and open a summer resort.

TOLEDO, O.—A. J. Snell, W. L. Hoyt, E. H. Potter and R. O. Thompson have organized the Toledo & Bay Shore Railroad Company, with \$25,000 capital, to build to Wigton's Point.

CLEVELAND, O.—Tom L. Johnson is reported to be interested in a project to connect Cleveland and Toledo with an electric line. It will only be necessary to build from Fremont to Toledo.

WADSWORTH, O.—The Wadsworth Electric Railway Company has organized, with F. G. McCuauley, president; W. A. Ault, vice president, F. C. Lee, secretary; J. S. Oberholtzer, treasurer.

WARREN, O.—The North Trumbull Rapid Transit Company has been organized to build 20 miles of electric road from Kinsman to Mesopotamia, where it will connect with a projected line to Cleveland.

YOUNGSTOWN, O.—The Youngstown Park & Falls Street Railway Company has let the contract for the construction of several miles of road of 66-pound 6-inch girder rail, to Harrold & Co., of Pittsburgh.

IRONTON, O.—The Ironton & Petersburg Street Railway Company is advertised to be sold July 5, by W. G. Ward, special master commissioner. D. Lamar, who bid in the property at the last sale, failed to complete the transaction.

EAST LORAIN, O.—The directors of the East Lorain Street Railroad Company are W. G. Gaivne, William McReynolds, John W. McReynolds, John A. Parkes, Edward S. Meyer. The company will build from Lorain to Cleveland.

Oregon.

PORTLAND, ORE.—It is reported that the Barnes Heights & Cornell Mountain Railway Company has revived the project to extend its lines to Hillsboro, 10½ miles.

Pennsylvania.

NORTH EAST, PA.—The South Shore Street Railway Company has been incorporated with \$100,000 capital.

BEAVER FALLS, PA.—H. M. Myers and John T. Reeves are about to build an electric incline railway 1,500 feet long to Patterson Heights.

ERIE, PA.—The Erie & Eastern Street Railway Company has been incorporated with \$25,000 capital. Henry L. Moon, Erie, is president.

PITTSBURG, PA.—Fred Gwinner, Allegheny, has been awarded the contract for building the Knoxville, Fair Haven & Mt. Lebanon Electric Railway.

ERIE, PA.—Charles M. Reed, Erie, is president of the Erie, Reed Park & Lakeside Street Railway Company, recently incorporated with \$50,000 capital.

TOWANDA, PA.—Edward Whalen has received the contract for building the new electric road. Two power stations and two car barns will be built, but the location has not been fixed.



HE MISSED THE LAST CAR, BUT PLACING A BANANA PEEL ON THE SLOT AND GRIPPING THE CABLE, RIDES HOME.

READING, PA.—Foreclosure proceedings against the Allentown & Bethlehem Rapid Transit Company have been brought by the Old Colony Trust Company, Boston, Mass., to recover \$200,000.

McKEESPORT, PA.—The McKeesport & Port Vue Passenger Railway Company has been incorporated with G. F. Myer, president; R. T. Carothers, secretary and treasurer; T. D. Gardner, R. C. Rankin, J. W. Allbig, directors.

PITTSBURG, PA.—The Pittsburg, Arlington & St. Clair Street Railway Company has been incorporated with \$21,000 capital, to build $3\frac{1}{2}$ miles of electric road from Sidney street and South Twenty-second street, to Mt. Oliver and Lower St. Clair township. C. E. Owens, is president, and Patrick Ridge, Michael Ridge, Alexander C. Owens, Pittsburg; Samuel S. Robertson, Allegheny, directors.

Tennessee.

CHATTANOOGA, TENN.—The company which is about to build an incline railway up Lookout mountain has elected J. S. Crass, president, and Vernon S. Whiteside, secretary and treasurer, and construction will at once proceed.

Texas.

ROCKDALE, TEX.—J. R. Rowland and R. H. Ames are interested in a proposed electric line, 20 miles to Elm Grove.

AUSTIN, TEX.—The sheriff has levied on the entire property of the Austin Rapid Transit Company to satisfy a personal injury judgment of \$6,000.

HILLSBORO, TEX.—The Hillsboro Street Railway Company has been incorporated with \$15,000 capital, by R. J. Ware, H. W. Carter and S. E. Carter.

SAN ANTONIO, TEX.—The line shaft in the power house of the San Antonio Electric Light Company broke and destroyed \$8,000 worth of machinery.

DALLAS, TEX.—A single track electric interurban to Ft. Worth has been surveyed. The distance is 32 miles. Arrangements have been completed, it is said, for the erecting of power houses.

HOUSTON, TEX.—Judge D. E. Bryant, of the United States circuit court, sitting at Sherman, has ordered the Houston Street Railway Company to show cause on July 11, why a receiver should not be appointed.

DALLAS, TEX.—The Dallas Street Railway Company has been incorporated with \$1,000,000 capital, by W. F. Thayer, New Hampshire; E. A. Studley, Theophilus King, Massachusetts; J. Gunter and Alex. Sanger, Dallas.

Utah.

SALT LAKE CITY, UTAH.—A. M. Nurin and S. L. Allen bought the West Side Rapid Transit Railway Company for \$10,000 at trustee's sale. They will probably build an extension, 11 miles, to Bingham.

Virginia.

RICHMOND, VA.—William H. Duhay, Andrew Bryson, L. H. Hyer, W. F. Jenkins, Edmund Pendleton, Louis Euker and A. B. Guigon are interested in the Richmond Conduit Railway Company, which was recently granted a franchise.

PETERSBURG, VA.—The property of the Petersburg Street Railway Company, of which Robert Gilliam is receiver, has been levied upon for \$700 city taxes, and the operation of cars on one line had to cease.

Washington.

SEATTLE, WASH.—E. P. Edsen has withdrawn his bid for the Ranier Avenue Electric Railway Company and the property will be again sold July 19, by the sheriff.

SEATTLE, WASH.—The Seattle Consolidated Street Railway Company lost its power house by fire; damage, \$75,000. The Third street electric line was damaged \$25,000.

TACOMA, WASH.—The City Park Railway Company bought the power house, real estate, etc., of the Port Defiance Company, and gave a mortgage for \$163,000 to S. Z. Mitchell, signed by Norman Tucker, president; C. N. Higgins, secretary. This is all that is known of the City Park Company.

West Virginia.

FAIRMONT, W. VA.—The Fairmont Suburban Railway Company has incorporated with \$1,300,000 capital by U. A. Clayton, C. L. Skinner, M. Marietta, L. P. Carr, C. E. Manley, Thomas O'Hara, A. B. Fleming, J. W. Irwin, R. L. Cunningham, O. Jackson, H. F. Smith, W. T. Hartman, all of Fairmont.

BENWOOD, W. VA.—C. W. Korn has attached the horses, wagons, harness, etc., of Wareham & Hughes, Beaver Falls, Pa, contractors for the Benwood, Moundsville & Southern Electric Railway Company, from Benwood to Moundsville, on account of non-payment for material for foundations of the power house.

Wisconsin.

MILWAUKEE, WIS.—H. M. Green, Pabst building, is promoting a company to build an electric line to Cudahy.

OSHKOSH, WIS.—The Oshkosh Street Railway Company will hold its annual meeting in July, when it will probably adopt electric traction.

LA CROSSE, WIS.—Fred H. Pickles, 20 Batavian Bank building, is supervising engineer of the La Crosse, Black River Falls & Neilsville Electric Railway Company.

SHEBOYGAN, WIS.—The Sheboygan Light, Power & Railway Company has been incorporated with \$200,000 capital, by J. M. Saemann, Geo. B. Mattoon and F. I. Saemann.

MILWAUKEE, WIS.—The South Milwaukee & Cudahy Street Railway Company is being organized with \$100,000 capital by M. C. Ring, C. E. Estabrook, W. M. Williams, Theobald Otjen, W. W. Stanley.

ASHLAND, WIS.—G. W. Harrison has been appointed receiver of the Ashland Lighting & Street Railway Company. Liabilities are \$169,000, of which \$44,000 is held by local banks and the remainder by the Northwest General Electric Company.

Wyoming.

SARATOGA, WYO.—W. A. Heathcote, Saratoga, and George F. Doane, Carbon, are interested in a proposed electric railway, 22 miles long, to Wolcott.



Miss Agnes L. Gamble has been appointed secretary of the Lima Electric Railway Company, Lima, O.

M. S. Robinson, general manager of the Fort Wayne lines spent several days in the city last month, while purchasing supplies.

W. H. Smith, formerly superintendent of the Ogden street railway, has become manager of the water company at Billings, Mont.

Isaac Blum has been elected president of the Hestonville, Mantua & Fairmount Passenger Railroad, succeeding the late Johns Hopkins.

G. J. Smith, master mechanic of the South Covington and Cincinnati Street Railway, visited the REVIEW and other Chicago friends this month.

John H. Fry has resigned the position of superintendent of the Detroit Citizen's Street Railway Company which he has held for many years. John Grant is his successor.

Col. Timothy S. Williams, who has long been associated with Gov. Flower, has been elected a director and secretary and treasurer of the Brooklyn Heights Rail Road Company.

George M. Kimmerlein will act as superintendent to fill the vacancy left by Mr. Hommell on the staff of the Milwaukee Street Railway. He has been with the company several years.

Edwin A. Smith has resigned as manager of the Chicago agency of the Consolidated Car Heating Company, Albany, N. Y., and has become connected with the Armour interests.

C. P. Evans will have charge of the Milwaukee Street Railway supply department in place of Harry De Steese who has gone with the Standard Railway Supply Company of Chicago.

B. J. Launiere, formerly secretary of the Grand Rapids Machinery Company, and a gentleman of fine business ability has joined the Metropolitan Electric Company, Chicago, as traveling salesman.

E. J. Wessels, general manager of the Standard Air Brake Company, New York, sailed on July 5 for Europe, where there is a great desire to know more about air brakes for street cars.

J. Henry Carson, president of the Sterling Supply & Manufacturing Company, New York, was married at the summer residence of the bride's parents, Rye Neck, N. Y., to Miss Helen Willets, daughter of John T. Willets.

Willis F. Kelly, general superintendent of the Columbus Street Railway Company, Columbus, O., spent a few days in Chicago before the Fourth, and favored the REVIEW with a glance at his genial countenance.

F. I. Saemann, secretary and treasurer of the Sheboygan City Railway Company, Sheboygan, Wis., which is being transformed into an electric line by C. E. Loess & Co., was in the city not long ago, and shook hands with the REVIEW.

W. A. H. Bogardus has retired as secretary and treasurer of the Long Island Traction Company. During his connection with these important street railway interests Mr. Bogardus has shown himself to possess great ability as a street railway manager.

Edgar C. Felton, general manager of the Pennsylvania Steel Works, has been chosen president of the Harrisburg Traction Company, Harrisburg, Pa. B. F. Meyers, president of the Citizens Passenger Railway Company, was elected vice president.

H. H. Harrison, who is so well known to the trade through his connection with the White-Crosby Company and previously with the General Electric Company, has become associated with R. B. Corey, dealer in arc lamps and carbons, Havemeyer Building, New York.

Clinton L. Rossiter, superintendent of the Buffalo division of the New York Central, has succeeded Daniel F. Lewis as president of the Brooklyn Heights Rail Road Company. Mr. Lewis by request will continue to fill the president's chair of the Long Island Traction Company.

George B. Willcutt, one of the brightest street railway men on the Pacific coast, and assistant to J. L. Willcutt, secretary and controller of the immense system of the Market Street Railway, San Francisco, spent several days in Chicago. He is making a two months' tour of inspection of Eastern roads, and is accompanied by his wife and son.

F. B. Brownell, of the Brownell Car Company, St. Louis, dropped in upon us not long ago. Mr. Brownell is receiving many letters from managers and others praising his "Car-Buyer's Helper," which is a work of great merit, full of much information, as much pains having been expended on its preparation is in building Brownell cars, which are universally admitted to be in every particular just as represented.

George W. Hommell, general superintendent of the Milwaukee Street Railway, who for the past eight years has been connected with the road has resigned. He leaves a host of friends in Milwaukee and those who have been associated with him know that he has been one of the hardest workers on the staff. Mr. Hommell does not intend to give up street railway work entirely but will take a rest.

PICTORIAL EVENTS OF A MONTH.

John Harris and John Weaver, of Cincinnati, pummeled each other not long ago. But it was not in anger. They simply put on the gloves at a picnic of the employes, thereby showing their kindly feeling and their interest in the men.

Horse cars are no more in Philadelphia, Omaha, Milwaukee and Brooklyn, as improved means of transit have made them useless.

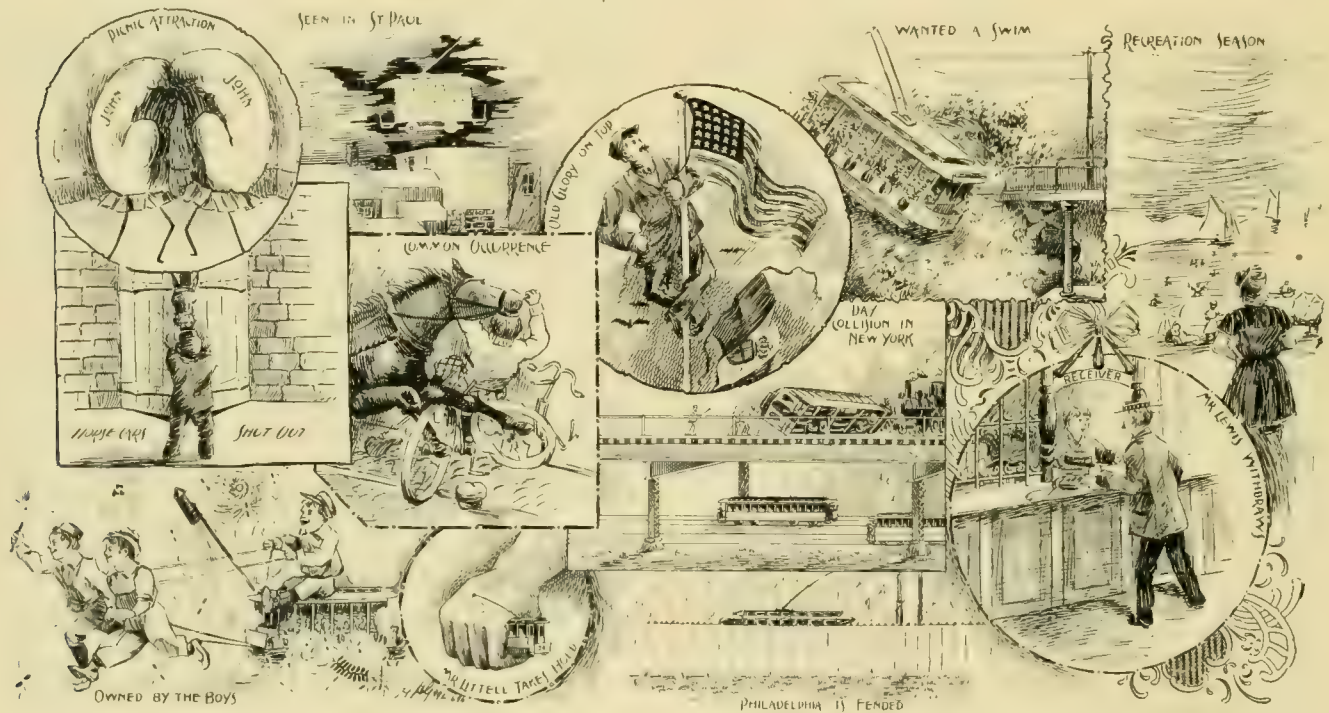
A St. Paul newspaper man is positive he saw an interurban car rising and falling with a regular undulating movement in the air about 20 feet above the housetops. If such a thing were possible, it would save much of the expense of operating street railway systems.

be placed above the flag of Italy. Refusal being made, in spite of the fact that there were 300 Italians in camp, they were told that the flag must come down, or it would be shot down, and it came down, while Old Glory was hauled to the top of the pole.

On a Cincinnati interurban a car apparently got tired of riding on steel, so it thought it would find easier going if it took to the water. Fortunately it changed its mind and stopped before it reached the brink.

H. M. Littell has taken hold of the Atlantic avenue system with his customary vigor.

On July 1 all the cars in Philadelphia were supposed to be fitted with fenders.



In many cities collisions between cars and riders of bicycles are common. In every case the rider has been at fault, as he has either failed to notice the approach of the car, or has misjudged its speed.

New York had a daylight collision on the Second avenue L, which seems to be inexcusable. A train stopped between stations, because it received a signal that a blast was about to take place in the street. The engineer of the train following did not see the one ahead and the collision occurred. Passengers on a surface car were frightened at the noise, and water which escaped from the tank. Nobody was injured.

Italian laborers on a line near Niagara Falls hoisted an Italian flag over their camp, while below it they nailed a small United States flag. Members of the G. A. R. went to the camp and demanded that the American flag

The Fourth of July is the day when the small boy runs things to suit himself. A favorite amusement is to throw lighted firecrackers in open cars.

Daniel F. Lewis has turned over his desk to Clinton L. Rossiter, who will preside over the destinies of the Brooklyn Heights Railway Company.

Now is the time the busy managers take a rest, if they can.

An American flag and a Fourth of July rocket with a red, white and blue circular, were sent to friends by the American Electrical Works, of Providence, R. I., as a reminder of the approach of the glorious day and that they are still manufacturing bare and insulated electric wires and cables.

PROJECTED INTERURBAN LINES.

Within a year 190 electric railway companies have been projected which propose to build 3,457 miles. Some of them are in process of construction and others will be pushed this season. The remainder will be completed some time. The table which follows shows the location of the roads with the number of miles. It also shows that there are many places which will require street railway supplies, and which may cause dealers to stiffen up on prices.

Ohio comes to the front with 31 roads, Pennsylvania, 26; New York, 23; Indiana, 15; Massachusetts, 14; California, 6; New Jersey, 5; Alabama, Colorado, Florida, Iowa, Minnesota, Mississippi, Nebraska, Rhode Island, South Carolina, Texas, Virginia, Washington, each one. Thirty-one states will build roads. The distances given in the table are only approximate.

TERMINI.	STATE.	MILEAGE.
Anniston—Coal City	Ala.	20
Los Angeles—Santa Monica	Cal.	20
Los Angeles—Pasadena	"	10
Merced—Yosemite Valley	"	62
Napa—Calistoga	"	24
San Jose—Gilroy	"	30
San Jose—Haywards	"	25
Saratoga—San Jose	"	12
Colorado Springs—Manitou	Colo.	7
Cromwell—Durham	Conn.	8
Rockville—Southbridge, Mass	"	28
Weston—Westport	"	4
Windsor Locks—Suffield	"	4
Dover—Milford	Del.	18
Harrington—Frederica	"	9
Wilmington—Brandywine Springs	"	6
Jacksonville—Tampa Bay	Fla.	50
Ocala—Silver Springs	"	6
Aurora—Carpentersville	Ill.	25
Chicago—Aurora	"	34
Danville—Hoopestown	"	25
Dixon—Rockford	"	35
Hoopestown—Gilman	"	26
Joliet—Chicago	"	32
Peoria—Pekin	"	7
South Freeport—Cedarville	"	10
Alexandria—Portland	Ind.	40
Anderson—Marion—Elwood	"	75
Batesville—Osgood	"	16
Elkhart—New Paris	"	15
Ft. Wayne—Hicksville, O.	"	40
Ft. Wayne—New Haven	"	13
Greensburg—Clarksville	"	40
Hammond—Lowell	"	27
Indianapolis—Franklin	"	22
Kokomo—Greentown	"	9
La Porte—Michigan City	"	12
Marion—Independence	"	12
Peru—Mexico	"	6
Terre Haute—Brazil	"	15
Valparaiso—Chicago, Ill.	"	40
Hopeville—Lorimer	Iowa	11
Centralia—Pawnee, Neb.	Kan.	28
Independence—Neodesha	"	30
Maysville—Mt Olivet	Ky.	22
Saxony—Fairfield	"	30
Sharpsburg—Mt. Sterling	"	11
Auburn—Turner	Me.	7
Augusta—Waterville	"	22
Baldwin—Parsonfield	"	23
Bangor—Oldtown	"	12
Kennebunkport—Saco—Waterboro	"	25

Norway—South Paris	Me.	2
Skowhegan—Madison—Athens	"	19
Stockton—Camden	"	25
Baltimore—Annapolis	Md.	22
Pikesville—Reisterstown	"	11
Randallstown—Harrisonville	"	5
Tacoma—Burnt Mills	"	6
Athol—Orange	Mass.	5
Dighton—Swansea	"	7
East Weymouth—Brant Rock	"	25
Gloucester—Beverly—Wenham	"	18
Hopkinton—Milford	"	7
Milford—South Framingham	"	12
Newton—Bristol	"	10
Palmer—Monson	"	6
Randolph—South Braintree	"	4
Revere—Winthrop	"	4
Spencer—Springfield	"	15
Springfield—Holyoke	"	16
Stoughton—Canton	"	5
Wellesley—Boston	"	13
Ann Arbor—Dearborn	Mich.	25
Detroit—Dearborn	"	8
Detroit—Toledo, O.	"	52
Detroit—Mt. Clemens	"	15
Jefferson—Gratiot	"	4
Mt. Clemens—Marine City	"	32
Duluth—Superior, Wis.	Minn.	5
Biloxi—Pass Christian	Miss.	20
Carthage—Galena, Kan.	Mo.	8
Oregon—Forest City	"	2
St. Louis—Morse's Mills	"	33
Omaha—Fremont	Neb.	36
Asbury Park—Branchfort	N. J.	6
Clark'sboro—Swedesboro	"	18
New York, N. Y.—Philadelphia, Pa.	"	80
Rahway—Woodbridge	"	6
Woodbury—Salem	"	25
Auburn—Port Byron	N. Y.	8
Buffalo—Ebenezer	"	6
Batavia—Oak Orchard	"	25
Castleton—Greenbush	"	8
Clinton—New Hartford	"	6
Corning—Painted Post	"	5
Dexter—Brownville	"	4
Little Falls—Herkimer	"	7
Frankfort—Utica	"	7
Hamburg—Buffalo	"	9
Niagara Falls—Buffalo	"	26
Olcott—Lockport	"	12
Peekskill—Mohegan	"	4
Port Chester—Mamaroneck	"	9
Port Jefferson—Patchogue	"	15
Roundout—Eddyville	"	3
Roslyn—Great Neck	"	3
Ravena—Rensselaerville	"	20
Salina—Cicero	"	12
Schoharie—Albany	"	32
Union—Binghampton	"	6
Waterloo—Cayuga Lake	"	7
Watkins—Havana	"	5
Ada—Kenton	Ohio.	16
Akron—Canton	"	25
Akron—Cleveland	"	30
Akron—Cuyhoga Falls	"	4
Akron—Kent	"	8
Ashland—New London	"	16
Bellefontaine—Lima	"	100
Bowling Green—Perrysburg	"	15
Bucyrus—Galion	"	11
Bucyrus—Sulphur Springs	"	6
Cincinnati—Dayton	"	65
Cleveland—Lorain	"	20
Cleveland—Painesville	"	30
Columbus—Buckeye Lake	"	26
Clay Center—Curtice	"	6
Elyria—Wellington	"	18

Fostoria—Tiffin.....	Ohio.	12
Jackson—McArthur.....	"	18
Kinsman — Burton.....	"	28
Kinsman — Mesopotamia.....	"	20
Marion—Port Clinton.....	"	75
Medina —Cleveland.....	"	30
Milan —Elyria.....	"	25
New Lisbon —Salem.....	"	10
Niles — Girard.....	"	5
Norwalk — Loudonville.....	"	20
Port Clinton—Ottawa.....	"	10
Springfield —Jamestown.....	"	30
Tiffin—Upper Sandusky.....	"	22
Toledo—Fremont.....	"	30
Toledo — Sylvania.....	"	20
Allentown —Kutztown.....	Pa.	32
Ashland—Centralia.....	"	4
Bethlehem—Nazareth.....	"	10
Broadford —Mt. Pleasant.....	"	8
Braddock —Homestead.....	"	2
Carbondale—Forest City.....	"	17
Charleroi —Brownsville.....	"	11
Columbia —Mt. Joy.....	"	6
Doylestown —Newtown.....	"	14
Elizabeth —McKeesport.....	"	23
Fair Haven —Mt. Lebanon.....	"	6
Greenwood —North Towanda.....	"	6
Lancaster —Marietta.....	"	22
Media —Chester.....	"	4
Nanticoke —Glenlyon.....	"	8
Newcastle—Tremont.....	"	12
New Cumberland—Shiremanstown—New Market.....	"	15
Oxford —Parkesburg.....	"	12
Oxford —Westchester.....	"	23
Pittsburg—Greensburg.....	"	30
Pottstown—Conshohocken.....	"	25
Pottsville—Minersville.....	"	10
Reading —Womelsdorf.....	"	15
West Chester —Downingtown.....	"	12
Willow Grove —Hatboro.....	"	3
York—Dover—Manchester.....	"	30
Providence—Fall River, Mass.....	R. I.	15
Spartanburg—Glendale—Clifton.....	S. C.	12
Rockdale—Elmgrove.....	Tex.	20
Bennington—Woodford.....	Vt.	4
Stowe—Waterbury.....	"	10
Winooski —Essex.....	"	12
Winooski—Ft. Ethan Allen.....	"	4
Keysville—Farmville.....	Va.	21
Fairmont —Minersville.....	W. Va.	15
Grafton.....	"	50
Wheeling —Moundsville.....	"	10
Aberdeen—Hoquiam.....	Wash.	4
Appleton—Neenah—Kaukauna.....	Wis.	26
Kilbourn City—Devil's Lake.....	"	14
La Crosse—Neillsville.....	"	80
Waukesha—Pewaukee Lake.....	"	6
Hamilton—Burlington.....	Canada.	10
Temiscamingue—Quinze Lake.....	"	15
Napierville —Remi.....	"	12
Perth Lanark.....	"	15
Total..... 190.....		3 457.

RECEIVER HAS NO STANDING.

Judge Beach of the New York City Supreme Court has ruled that foreign receivers have no standing in court. H. D. Thompson, receiver of the Steubenville Street Railway Company, a corporation of Ohio, brought suit in the New York courts to recover from the original stockholders the amounts of their unpaid subscriptions to the capital. On demurrer his case was thrown out of court, and he will have to proceed in some other manner.

STANDARD RAILWAY SUPPLY COMPANY.

On July 1, Harry DeSteeze of the Milwaukee Street Railway, joined the ranks of the supply men and became secretary and treasurer of the Standard Railway Supply



HARRY DE STEESE.

Company, Monadnock Building, Chicago. Garson Myers, who is too well known to need an introduction to our readers, continues as president and general manager. He has been connected with practical manufacturing for twenty-five years, of which the last five have been given exclusively to the wants of electric railways. Mr. DeSteeze has been in street railway work five

years, having been with the Sioux City Cable Road as assistant manager for two and one-half years, and three years as storekeeper for the Milwaukee Street Railway. It is safe to say that no street railway in the country is obliged to carry a larger and more varied stock of supplies than the Milwaukee Street Railway, and consequently Mr. DeSteeze has had the very best of opportunities to become familiar with street railway supplies. He is a young man whom it is a pleasure to meet and is sure to make many new friends in the new work he has taken up. He will direct the Chicago office which, by the way, is to be moved to larger quarters in the Monadnock. The company aims to handle a few of the best street railway supplies rather than a great variety.

The Standard Railway Supply Company is western selling agent for R. D. Nuttall gears, pinions and trolleys, Seamless Structural Company's steel gongs, A. & J. M. Anderson Company's line material, the Kraushaar Lamp & Reflector Company's headlights and brake handles, Phoenix insulating paint, and Anderson Du Puy & Company's steel springs and forgings. A good volume of trade is being enjoyed by the company whose close attention and courteous treatment of orders has won for it the confidence of many patrons.



GARSON MYERS.

The Detroit Railway distributed a handsome folder advertising that its system was ready for business. The

front cover was a design showing the tall chimney of its power house, a car and samples of its tickets, which sell eight for a quarter. The cover reads, "The Detroit Railway, July 8th 1895, inauguration of the new railway system of progressive Detroit." Inside is a map of the system and on the last page of the cover is a list of officials.

THE NELSON VESTIBULE.

In the February REVIEW was illustrated the vestibule designed by S. L. Nelson, manager of the Springfield Railroad Company, Springfield, O., to conform with the requirements of the Ohio law compelling vestibules on cars. The construction of the law by the authorities was that the entire platform must be covered by the vestibule. Mr. Nelson made a careful study of the vestibule question, and the result was a galvanized iron vestibule that met all the requirements. Since the illustrations that were printed that are shown on page 101 of the February REVIEW and page 357 of the June REVIEW the vestibule has been improved. All of the cars of the Springfield Railway Company are being equipped with iron vestibules, which

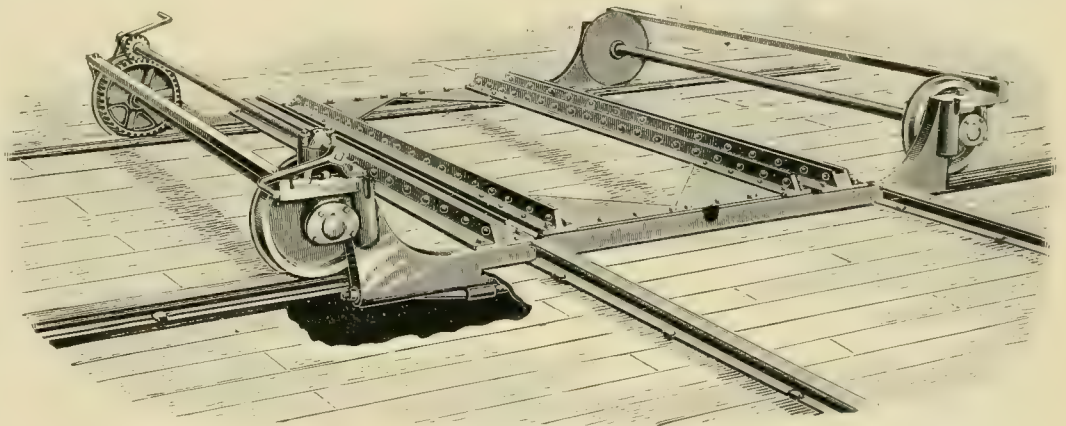
Mr. Nelson writes are cheaper, lighter, more durable and more attractive than any others the company has tried. These vestibules are manufactured by the Peet & Schuster Company, Springfield, O., which is in position to furnish them in any quantity to street railways, and will give full particulars on application.

THE CAR BUYER'S HELPER.

To call the elegant 170 page volume just issued by the Brownell Car Company, of Saint Louis, a catalogue or a pure and simple advertisement is to do it an injustice. The "Car Buyer's Helper" is published with the intention of educating the street railway men who buy cars, so that they will know poor work from good, and act accordingly. That the Brownell Car Company expects to profit as a result of such increased knowledge among its customers, goes without saying. The title page bears the inscription "How a good car differs from a poor one, and how to get it." The details of good and bad car building are taken up at length and fully explained and illustrated. The history of the accelerator car is also given, and taken altogether the book is one which it is a pleasure in itself to read, as well as being worth perusing from a business standpoint.

HATHAWAY'S LATEST TRANSFER TABLE.

The excellent qualities of the Hathaway Transfer Table are known throughout the length and breadth of the land, where they have been in constant daily service for years. But the spirit of the street railway industry is one of constant progress, and so it comes to pass that even so good a table as the Hathaway has been greatly improved. This change has been induced through the adoption of electricity and the consequent increase in size and weight of cars. The table retains the general form of the old style, one of the great advantages of which is the fact that no pit is required for its use. The new table is of the best steel, and equipped with the Hathaway improved anti-friction running gears. All the tables are also supplied with a hand starter that will enable one man to transfer the heaviest electric car with one hand. The table is the strongest and most durable



HATHAWAY'S LATEST TRANSFER TABLE.

in the market and is sold with a written guarantee for four years. Recently one of these tables was installed in the car house of the Cleveland City Railway, and that veteran street railway builder, Charles Hathaway, transferred their heaviest car with the use of only one finger. Notwithstanding the fact that the new table is more expensive to build and will last longer than the old style, the facilities for manufacture and the increasing demand has made it possible to reduce the selling price, an announcement which never fails to bring joy to the heart of the careful buyer. A gratifying feature of the Hathaway tables has been the fact that where one was installed, additional car house room never fails to create an order for more of the same kind. Alfred G. Hathaway, the manufacturer, is one of the most enterprising of the younger supply men, and in perfecting his various appliances has had the further advantage of the wide and ripe experience of the Senior Hathaway who has been in street railway interests continuously since 1859 when he built the first street railway in England.

B. F. Harris, Jr., general manager of the Urbana & Champaign Ill., Electric Street Railway Company, is engaged to be married to Miss May Melish, only daughter of William B. Melish, of Cincinnati.



Dorner & Dutton have orders coming in so fast for trucks, car wheels, gears and pinions that they will have to keep the night force working for the next two months.

The American Register Company has been incorporated at St. Louis, Mo. The capital stock is \$50,000; and the incorporators are A. S. Partridge, H. Orrick and Leo Ehrlich.

The Norfolk & Ocean View Street Railway Company, Norfolk, Va., is installing two 125-horse-power tandem compound "Ball" engines, built by the Ball Engine Company, Erie, Pa.

The John Stephenson Company, Ltd., has been awarded the contract to build 100 closed, vestibuled car bodies for the Detroit Citizens Street Railway Company, at a cost exceeding \$100,000.

L. E. Roberts, formerly in charge of Lewis & Fowler's register department, is now general agent of the Johnson Company. He will have special charge of the Du Pont trucks made by that company.

"Truths" are dealt with in the neat 1895 pamphlet, just issued, describing the construction and operation of the Hogan water tube boilers as manufactured by the Hogan Boiler Company, of Middletown, N. Y.

The Gilbert Car Works at Troy, N. Y., have been sold under foreclosure of mortgage held by the Atlantic Trust Company, of New York. The sale price of \$72,000 is far below the actual value of the plant.

Max A. Berg resigned July 1, as secretary of the Wallace Electric Company, Chicago. Mr. Berg will take a well earned rest, and no doubt will become associated again with the electrical industries in a short time.

The Ohio Brass Company, Mansfield, O., has sent out to the trade its No. 3 catalog, which succeeds No. 2. The new work is larger and more complete than the other, and it should be in the office of every company.

Charles Mayer, the well known supply man of Philadelphia, is kept busy supplying the wants of managers in his section. The secret of his success is his own ability, and the high grade of all the specialties he handles.

The Standard Air Brake Company, through E. J. Wessels, general manager, has just sold ten equipments to the Montreal Park & Island railway, Montreal, Canada. This will afford at the next convention a most

practical demonstration of the excellent work of these brakes, and just what managers most prefer,—the actual every day work in regular service, which is always more satisfactory than any temporary display, however good.

The Brooklyn & New York Railway Supply Company with \$200,000 capital and \$200,000 bonds has succeeded the Lewis & Fowler Manufacturing Company and the Lewis & Fowler Girder Rail Company, of Brooklyn.

John L. Vance, who recently purchased the Gallipolis Street Railway Company, Gallipolis, O., has let the contracts for cars to the Barney & Smith Company, Dayton, O., and for electrical equipment, to the General Electric Company.

The White Manufacturing Company of New York has over 100 of its make of plow on the West End Street Railway of Boston, 30 on the Brooklyn City and 30 on the Consolidated Traction of Jersey City and Newark, a striking testimonial to this all steel snowplow.

Engine and Boiler Room is the title of a new journal of steam engineering, which is edited T. P. Pemberton and A. Bement and managed by S. K. Monroe, 226 La Salle Street, Chicago. The subscription price of this bright little journal is only 50 cents a year.

The Chicago, Milwaukee & St. Paul Railroad has removed its Chicago ticket office to No. 95 Adams street, in the palatial new Marquette building. Persons expecting to make a tour through the Northwest can obtain full information as to fares, etc., at the new office.

The Armitage-Herschell Company, North Tonawanda, N. Y., has been having a busy season supplying its steam riding gallery to street railway companies, which find them to be money getters at summer resorts. There is something about these galleries which attracts both old and young.

As high grade manufacturers the Harrisburg Foundry & Machine Works, of Harrisburg, Pa., have gained a well deserved position in the engine and boiler world, and it will be to the direct advantage of all buyers to make themselves familiar with their fine types of engines and boilers.

The Ball & Wood Company, of New York, with works at Elizabeth, N. J., has the contract to furnish two 700-horse-power and five 600-horse-power engines of a new type, and one of 300-horse power, for the model plant which the Edison Electric Illuminating Company is erecting at Paterson, N. J.

The Eddy Electric Manufacturing Company of Windsor, Conn., has made some important changes in its working force. H. B. Coho & Company will have charge of this company's business for New York City and vicinity. G. M. Anger & Co., with office at 64

Federal street, Boston, have the selling agency for the New England states. S. N. Blake has been appointed agent for New York state outside of New York city, with office at Elmira, N. Y.

The St. Louis Car Company is very busy; among recent orders are 80 sets of its new double trucks for the Union Depot road, St. Louis, for whom, also, it is building three handsome mail cars. Three eastern cities also take 100 sets of the company's double truck; and 20 convertible cars of the Henry patent are building for Pittsburg.

W. B. Crane & Co., hardwood lumber dealers, Chicago, who make a specialty of white oak ties for street railways, have set up a sawmill in their lumber yard for resawing. They have mill connections which enable them to supply any quantity of high grade cross ties without delay, and in addition carry a stock in their Chicago yard.

James Boyd & Bro., Philadelphia, have sent to managers a list of special trade discounts applying to their electric railway supply catalog A. The firm is making special prices and pushing the star soldering stick, which is said to be a non-corrosive substitute for acids, soldering salts, rosin, etc. The full size is 6 inches long and $\frac{7}{8}$ -inch diameter.

James Partridge, of the Partridge Carbon Company, Sandusky, O., was a Chicago visitor, looking after his business interests. He says the factory is kept busy on orders for carbons, which are making more friends every day on account of their excellence. Although they are more expensive in first cost than some other carbons they do not have to be renewed so often.

The West End Railway, of Boston, has recently placed an order with the General Electric Company, covering two 800-kilowatt, two 1,300-kilowatt and one 1,500-kilowatt generators, all to be directly connected to the engines. This is one of the largest orders for railway generators ever placed at one time, and we are informed, was secured on the merits of the machines only.

The Bates Machine Company, Joliet, Ill., has built two engines for the Jasper County Electric Railway Company, Webb City, Mo. The engines are 18 by 48 inches and will drive a 200-kilowatt Walker generator by the Hoadley rope transmission. The company has shipped a 32 by 60 engine of 750-horse-power to Canal Dover, O., and another high pressure engine of 800-horse-power to Chicago.

Frank P. Bell, manager of the Aragon Hotel, Atlanta, Ga., who will no doubt again number among his guests many of the visitors to the Atlanta convention, has secured the concession for a roof garden on top of the Forestry building at the Cotton States and International Exposition. He will undoubtedly receive the success he

deserves for the same ability that maintains such a high standard of excellence at the Aragon, will assure visitors that everything will be first class in the roof garden.

E. L. Barr has succeeded Max A. Berg as secretary of the Wallace Electric Company, Chicago. Mr. Barr has a wide acquaintance with the trade, having been connected with the Canadian General Electric Company, and more recently representing the Wallace Electric Company on the road. The Wallace Electric Company is closing out its merchandise business and will devote itself exclusively to the interests of the manufacturers of all important electrical material and specialties which it represents in western territory.

Our readers will recall the interesting and detailed description which appeared in these columns over two years ago, upon the occasion of the inauguration of the Mattock, England, cable railway. We now learn that the rope which went into service on that line in October, 1892 ran steadily, lasting nearly two and a half years. This, too, with several sharp curves and one 20 per cent grade. The rope was made by George Cradock & Company, Wakefield, England, which firm has supplied the new rope on the Mattock road.

The Metropolitan Electric Company is having a fine business in the specialties for street railway companies, which it handles. Among them are the portable hose bridge which has proven such a convenience in cases of fire, as it prevents blockades. Managers who have used them would not be without them, and have highly recommended them to others. The company is doing a better business in the fan motor line than ever before, and has reduced the price of 12-inch alternating fan motors. The Metropolitan incandescent lamp is giving great satisfaction, and large numbers are being sold.

Charles A. Schieren & Co.'s export trade in leather belting has, without pushing, increased to such an extent that the firm has sent a representative on a tour of the world to visit old friends and new customers. He will pass through South Africa, Madagascar, Siam, Burmah, Hindustan, Ceylon, Java, the Philippine Islands, Australia, China and Japan, and will be absent two years. The New York office recently has received orders for outfits of perforated electric belts for plants in Bangkok, Siam; and Maracaibo, Venezuela; as well as a large order for an extensive saw-mill in Auckland, New Zealand.

Bowers Bros., Chicago, miners and importers of mica, have been forced by their increasing trade to lease the second floor of 117 and 119 Lake street. They have improved facilities for stamping and building up of segments. They carry in stock a large quantity of segments for all standard street railway motors and stationary motors and generators. They also carry in stock a full line of Billings & Spencer drop forged copper commutator bars for which they are western agents. They are

therefore, able to furnish the bars and segments in convenient and compact form immediately on receipt of order. They have mines in North Carolina and are large importers of India mica.

The St. Louis Iron & Machine Works, St. Louis, have received numerous orders for their "St. Louis" Corliss engine, among which are Los Angeles Electric Company, Los Angeles, Cal.; Municipal Electric Company, Decatur, Ill.; Standard Electrical & Gas Works Company, Independence, Ia.; Mueller Manufacturing Company, Decatur, Ill.; Creamery Package Manufacturing Company, Kansas City, Mo.; Charles G. Stifel, St. Louis, Mo.; Ellis Grove Milling Company, Ellis Grove, Ill.; Colburn Brothers, McPherson, Kan., and Keiser Brothers Milling Company, Mt. Olive, Ill., all for compound engines ranging from 75 to 400-horse-power; besides a 700-horse-power heavy duty engine for the Union Depot Railroad Company, St. Louis, Mo.

The Heine Safety Boiler Company, St. Louis, is doing a larger business than ever before in its history. During June orders were taken for 3 boilers aggregating 1,000-horse-power for the Lucerne, Dallas & Havery's Lake Railway, Wilkesbarre, Pa.; 2 of 600-horse-power for Hartford, Conn., Street Railway Company; 2 of 400-horse-power for Fairmount & Lynchburg, Va., Railway Company; 2 of 420-horse-power for Bergen County, N. J., Traction Company. Some large orders in other lines are Chicago Edison Company, 1,100-horse-power; Ansonia Brass and Copper Company, Ansonia, Conn., 1000-horse-power; Solway Process Company, Syracuse, N. Y., 4 large boilers for utilizing waste heat from furnaces; and Consolidated Gas Company, Indianapolis, 1,500-horse-power.

The Central Electric Company, Chicago, has been working up a trade in machine made coils for railway motors. So great has been the demand that a large stock of coils for G. E. 800 and Westinghouse No. 3 motors warranted to be perfect in workmanship and form, is kept. A good demand is also reported for the B. & S. electrical insulating compounds which are made in three grades, No. 1, No. 2, No. 3, the first being quite thin and the third very thick with No. 2 of a consistency between the two. All three grades dry quickly and leave all substances coated with it in an elastic condition. It is waterproof and is used in painting moldings, wires, cables, cut out boxes, battery boxes, joints, armature coils, field coils, etc. There is a large and growing sale of the Billings & Spencer drop forged line material and commutator bars.

R. B. Corey, general sales agent of the General Incandescent Arc Light Company, makes strong claims for a new railway circuit arc lamp as filling the difficult requirements in a satisfactory manner. Past experience has taught the need of caution in this branch of the arc light business, and the company has not announced this lamp

without having had satisfactory experience with a considerable number of them. The mechanism of the new lamp is very simple. There is only a rack pinion with one wheel operated by a single magnet. There are no springs in the adjustment and the magnet and resistance on each lamp are as near fire and waterproof as they can be made. The carbon holders are adjustable for carbons of $\frac{1}{4}$ to $\frac{11}{16}$ inch diameter. The regular current is six, eight or ten amperes and can be made to burn from eight to fifteen hours, according to requirements. Like all lamps made by the General Incandescent Arc Lamp Company, they are handsome in appearance, weather-proof, and well constructed.

LAKE STREET ELEVATED ELECTRICAL EQUIPMENT.

As announced by the REVIEW last December the Lake Street Elevated Railroad of Chicago is to change its motive power to electricity. The change has not come as quickly as was anticipated by its officers at that time but the past month has seen the letting of the contract for the motor equipment, and also a contract for furnishing the motive power. The General Electric Company secured the contract for the motors. The first order is for 25 double equipments of G. E. 2,000 motors, with controllers, circuit breakers and other appliances, practically the same as the Metropolitan Elevated. A contract has been made to furnish the power by the West Chicago Street Railroad which has its station near a central point on the line of the elevated road. The change will not be completed before late in the fall.

THE ELECTRICAL JOURNAL OF THE PACIFIC.

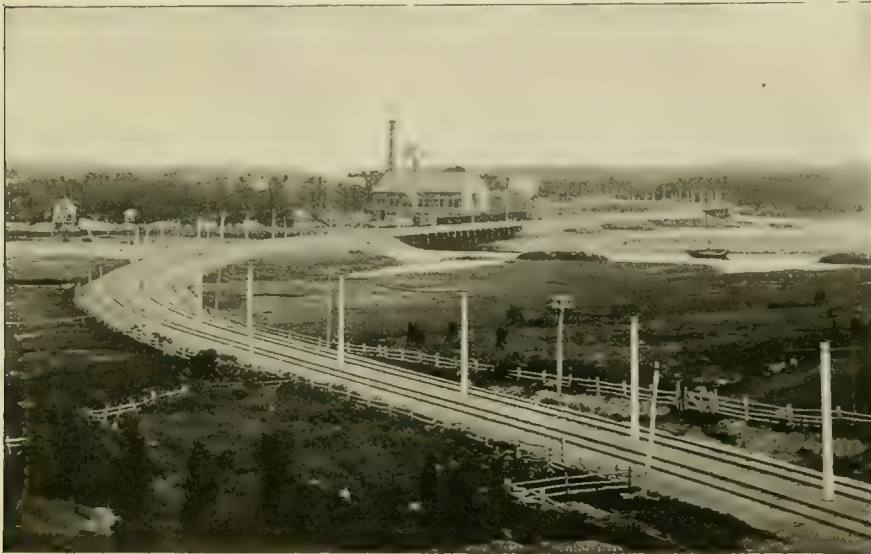
We welcome to our exchange table this month the Electrical Journal, a paper which will be published monthly at San Francisco. The editors are F. A. C. Perrine and George P. Low, which fact in itself is enough to insure a publication of the very highest class. It claims to be the "newest electrical publication in America," which claim we think cannot be denied in its literal interpretation, and we hope that time will prove that the word newest has a double meaning in this case.

The new Citizens' Street Railway at Battle Creek, Mich., which was started last winter with a modern equipment, has been doing a good business. The sad experience of the old electric railway, which had to cease operations two years ago, had led some superficial observers to conclude that Battle Creek was not a street railway town. By the success of the new road the little city on the Kalamazoo has regained its prestige, and largely through the good management of Edwin E. Downs, who has been with the new enterprise since its inception. Mr. Downs was well qualified for his difficult task by an extensive experience in street railway building for the General Electric Company in various cities, east, west and south.

ELECTRICITY ON A STEAM ROAD.

The Nantasket Beach Branch of the New York, New Haven & Hartford Is the Entering Wedge.

The Nantasket beach branch of the New York, New Haven & Hartford Railroad was opened for electric traffic Sunday, June 30. This is the first application of electric traction to a standard steam road. The Nantasket beach railroad extends from the Old Colony House



VIEW ON LINE.

Station as far as the Pemberton Station, a little beyond Hull, at the extremity of the narrow peninsula, one side of which is known as Nantasket Beach. The length of the road is 6.91 miles, and of this there are 4.4 miles of curves in about 20 curves, the sharpest being one of 10 degrees. The line is almost level, the only grade being one of about 34 feet to the mile. The track is laid with 70 pound rails, with 15 feet space between the track centres and the ballast is of stone. Each joint is bonded with a flexible No. 0000 bond of stranded copper, seven inches long, riveted into the flange of the rail. There are present ten stations but others will be built to allow of stops about every $\frac{1}{4}$ mile.

The overhead trolley line is carried upon poles set between the tracks. These poles are of southern pine, thirty feet long, twelve by fourteen inches at the butt, and ten by ten inches at the head; and are set at intervals of sixty and seventy feet on the curves, and ninety feet on the straight track. At the cross overs the posts are 180 feet apart, and side posts are used carrying a light iron truss over the track. On the trestles they are carried down through the trestle floors and are bolted to cross

timbers fastened to the piles. The top of each pole is fitted with a cast iron grooved cap, the grooves of which carry the six bare copper feeder cables, each of which has a cross section of 500,000 circular mils. The poles are set in wooden boxes filled with concrete, and are leaned towards the inside track on curves to throw the trolley wire over, and thus provide for the angle of the trolley pole caused by the 4.8 inches elevation of the outer rail.

Trolley wire.
Exact size.

The trolley wire is of unusual shape being something like a figure 8 in section as shown herewith. It weighs one pound per foot, and has a cross sectional area of 330,000 circular mils. The lower surface is almost flat, and provides a large contact surface for the trolley wheel. This form has been given to the wire to permit of a more perfect attachment to the hangers and to prevent the trolley from jumping when passing them. It was rolled by Roebling's Sons. The brackets of two angle irons, are bolted across the centre poles and bent and bolted together at the ends. They are kept in position by an iron truss running through the cap. Each hanger is a double hanger, and gives an excel-

lent support for the wire. In stringing the trolley wires and setting the poles, steam locomotives were employed, and by their use the work of months was shortened into weeks. Indeed, the entire installation is

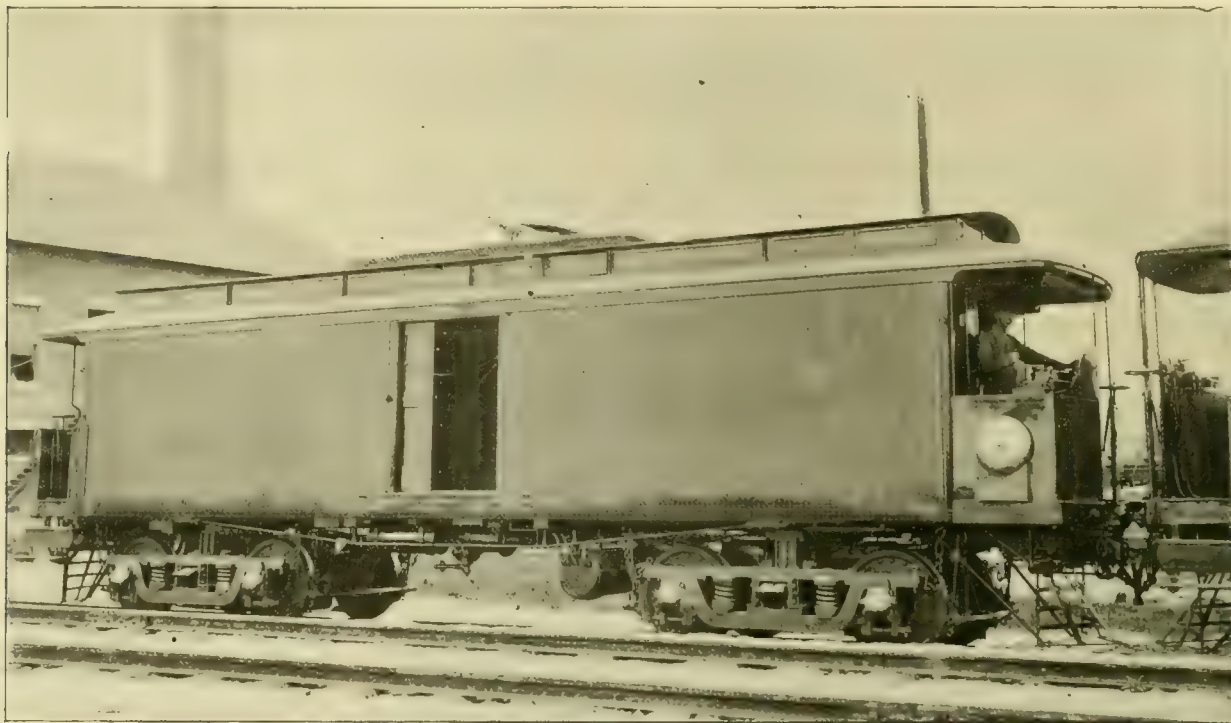


LINE AT POWER HOUSE.

an example of extremely rapid work. The power plant is similar to other large modern direct connected stations. The two generators are direct connected General Electric 10 pole machines, having the armature spider keyed to the engine shafts. They are wound for a pressure of 600 volts at no load and 700 volts at full load, and are

rated at 500 kilowatts at 100 revolutions per minute. The fields are of cast steel and the armatures are of the "iron clad" type, each winding being insulated and then

tinuous steps or foot boards. The closed motor cars are 42 feet long over all, and are built extra heavy, weighing each when fully equipped over 30 tons. Two of the

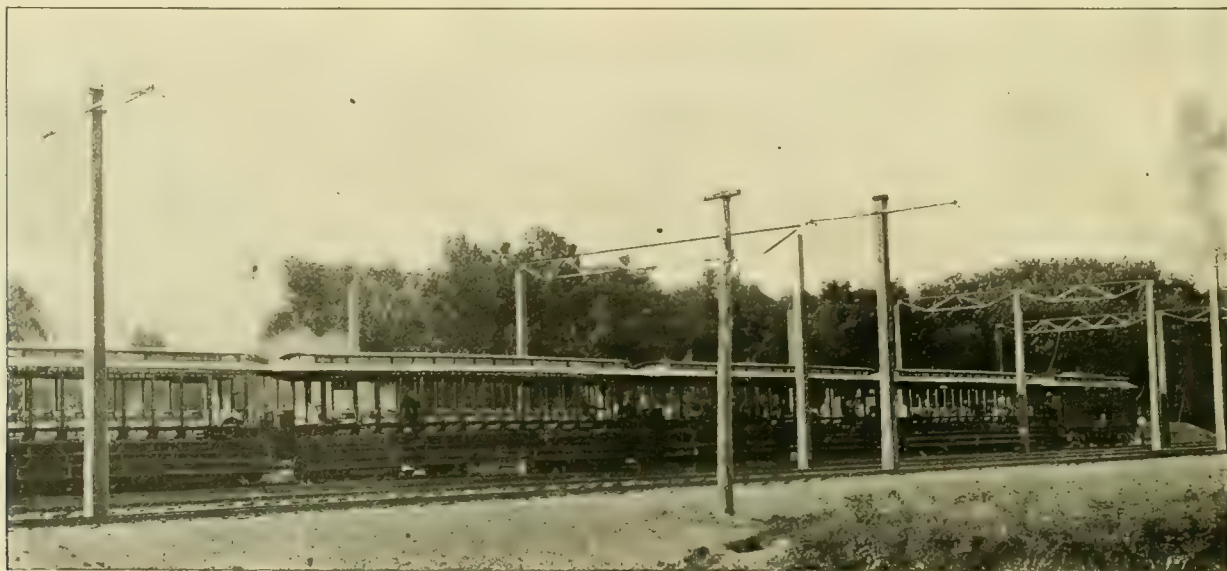


BAGGAGE CAR—A 100-HORSE-POWER MOTOR ON EACH AXLE.

imbedded in an insulated slot in the laminated iron armature body.

The motor cars are of two types, the closed and the open. The closed cars are heavy baggage cars, and

four ordered will have two motors on one truck, while the two others will have four motors, two on each of the two trucks. The open motor cars will have two motors. The motors used are the General Electric 2,000 machines



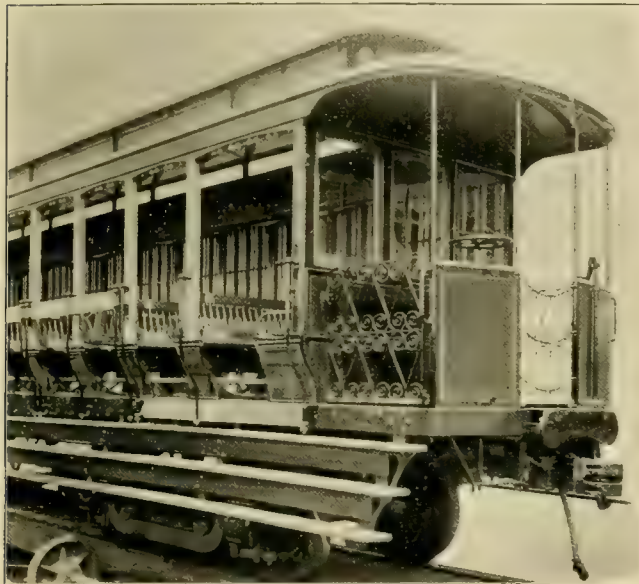
TRAINS AND OVERHEAD CONSTRUCTION AT SWITCHES—N. Y., N. H. & H. R. R.

four are already equipped for service. The open cars are sixteen reversible bench cars, built by the Barney & Smith Company, of Dayton, O., and six are now receiving their equipment. The open cars resemble the familiar city trolley car, but have a flight of three con-

especially designed for heavy work, and are similar to those in use on the Metropolitan Elevated Railroad in Chicago. The drawbar pull of the double motor cars is 4,000 pounds, that of the four motor cars 8,000 pounds. The motors are 100 horse power each, or 2,000 pounds

horizontal drawbar pull through a 33-inch wheel. The current is brought from the trolley wires by a trolley wheel having an extra deep channel.

The controller is the type "L" like that on the Metropolitan Elevated described in our May issue. There



OPEN CAR—NANTASKET BEACH RAILROAD.

are two on each car. Immediately to the left of the controller is the air brake handle. The compressed air for the brakes and whistle is furnished by an oscillating cylinder air compressor operated by an electric motor, which is controlled by a special automatic rheostat which regulates the action of the motor in accordance with the pressure in the tanks. A magnetic cut-out is also provided for the air compressor motor. In the case of the closed cars the air pump is set just within the door. In the open cars it stands on the platform to the extreme left of the motorman. Behind the motorman and just under the hood is the car cut-out, which in this case is an automatic circuit breaker, similar in type to that used on the generator panels in the station.

A feature of the line construction is the system of interlocking switches, by means of which the overhead switch is thrown at the same time as the track switch.

Credit is due not only to the New York, New Haven

and Hartford, but to the engineers of the General Electric Company who did such rapid work in planning the installation. Chas P. Clark, president of the road was the prime mover in this new step. Col. N. H. Heft supervised the work.

Motor cars alone have been run during tests as high as 80 miles an hour. A party of officers visited the road just before opening and J. C. Sanborn, division superintendent surprised the party by sending a train of 40 loaded gravel cars hauled by one four-motor car 40 miles an hour past the visitors.

This road is only the first of a large number of steam roads that will use electricity to handle a special suburban business. The Chicago & Northern Pacific, a Chicago terminal road, has recently decided to adopt electric traction for its suburban business so that it can operate on short headway. The Niagara Falls branch of the New York Central and the Mount Holly branch of the Pennsylvania Railroad are now being equipped. The Illinois Central, at Chicago, is again considering the use of electricity for its suburban traffic. We expect any day to hear of other roads about to make the change.

FIRE AT SEATTLE, WASH.

A mysterious fire broke out in the car house of the Seattle Consolidated Street Railway Company, at midnight, June 19, and soon consumed the entire contents, 29 cars, all told, of which 27 were passenger cars, 1 freight and 1 wood car.

In the basement of the burned building were the engine and boiler plants furnishing the motive power for the road. The generators, engines and boilers were not badly damaged and can, according to the insurance adjusters, be repaired. As it is, the loss is estimated by Receiver Backus at \$75,000, with \$40,000 insurance. Views of the ruins are shown herewith.

The problem of how to operate his lines without cars and without power house confronted Receiver Backus when he was called from his slumbers at 1 o'clock in the morning. Men were hastily dispatched to start the disused Grant street power house and to borrow cars and power from other roads. At the regular hour in the morning operation was begun as usual, but with only half



the number of cars. The citizens who had expected a complete tie up, were agreeably surprised and quite satisfied with the partial service.

BOYD-PECK.

The REVIEW is greatly proud of its social record, for within the past year it has furnished from its editorial and business force three weddings and one clergyman. The latest event in this line, and which it gives us very great pleasure to announce, is the marriage, on July 9, of Mr. James Boyd, associate editor of this magazine to Miss Mabel Katherine Peck. The happy event was celebrated at the residence of the bride's parents, Mr. and Mrs. William Wesley Peck, Chicago.

The groom is recognized among the newspaper fraternity of Chicago as one of the brightest, most conscientious and progressive writers in the city, and earned a high record on the leading dailies of Chicago before entering the field of technical journalism. Since joining the REVIEW he has rapidly won the respect and esteem of street railway men who will join with us in the hope that the largest possible share of prosperity and happiness may attend them both through a long life. The bride is one of the most beautiful, accomplished and popular society young ladies on the South Side, and has also won bright literary laurels through contributions and special work for the Chicago papers.

Mr. and Mrs. Boyd will make an extended trip through the East, stopping at all the principal places of interest and at the sea shore.

Operation has commenced on the electric railway at Lille, France.

OTTAWA'S FIRST ANNUAL REPORT.

The report submitted to stockholders of the Ottawa, Ont., Electric Railway Company at their first annual meeting, June 24, was very pleasing to the investors and creditable to the management. The receipts were \$193,991 for the year ending May 31 and the expenses \$122,335, leaving a balance of \$71,655, or 10 per cent on the average paid up stock, which was increased from \$625,600 to \$814,800 during the year. The number of passengers carried was 4,119,084 against 2,797,881 for the corresponding period preceding. The receipts per car mile were 15.65 cents, expenses, 10.04 cents. Extensions will be constructed this year, adding about one-third to the present mileage.

D. A. Belden, general manager of the Carpentersville, Elgin & Aurora Railway, was recently made a flattering and tempting offer by the owners of the Seattle Consolidated, but has finally decided to remain at Aurora in charge of the extensive urban and interurban system now being built up the Fox river.

Thankfulness!

"If you hav'nt got much, be thankful and you will double it," sounds well and may apply correctly in song and proverb. But it brings little consolation to the purchaser of an inferior but "cheap" lighting system. Perfection mechanically, efficiency electrically, carries more weight in a proper accounting of receipts and expenditures than all the proverbs ever written. Now, experience has demonstrated time and again, that no electric-lighting system can be operated so satisfactorily, so efficiently, so economically, as the Standard system, either arc or incandescent. Adapted to all forms of interior or exterior illumination.

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H. H. WINDSOR,
Editor.

F. S. KENFIELD,
Business Manager.

CORRESPONDENCE.

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

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VOL. 5. AUGUST 15, 1895 NO. 8.

COMPRESSED air is once more coming into prominence, experimentally at least. At Westfield, Mass.; Rome and Albany, N. Y.; Baltimore, and New York city, tests are either being made or are nearly ready.

Is YOUR road working the trolley party fad to the extent of its greatest possibilities? Philadelphia easily leads all the other cities, and to such an extent has the idea developed that a recent trolley party required 61 cars to transport its guests.

THE world do move. The Czar of all the Russias has actually endorsed in his own handwriting the report of his expert engineers who have been studying electric traction in other countries, with these words: "Very interesting, and desirable to be introduced in Russia."

WE congratulate street railway superintendents upon a matter that is likely to be of benefit to them. Chief Moore, of the weather bureau, has ordered all weather station chiefs to give them warning of the expected occurrence of unusual weather. Prof. Moore when located at Chicago was frequently of service to the street railways in such cases.

ARE you careful enough in the method of issuing transfers, so that you are not robbed by the public? In some localities it is customary for passengers to take transfers even if they do not intend to use them. Many stores get hold of them and deal them out to customers. The company carries the passenger, but gets no nickle. If possible transfers should be limited to the first car passing the transfer point.

REPORTS from Calcutta announce severe losses to the tramway company from horses dying of sun stroke and heat apoplexy; the usual methods of shading the horses' heads proving insufficient. It seems longer than six years since a hot August day caused intense anxiety to the managers of every street railway in the country, who at morning could only guess what would be the amount to charge to "loss on horses" when night came. What a prodigious backward step it would be to return to animal power!

CARE in the keeping of records is of more importance in the economy of street railways than many people are aware. We have in mind a road that was in the market to be sold, but its accounts were in such bad shape, that it was impossible for anybody to know its exact condition. An expert was employed to look over the books, who reported at a meeting of stockholders that on account of the carelessness and negligence in keeping the books, he could not get at the exact condition of the company's finances. There is no excuse for such a state of affairs, and it is no wonder the road was in bad shape.

THE plan of organizing a consulting board consisting of the heads of departments, for the purpose of meeting regularly and discussing the various problems which come up, has not been adopted by very many companies. It is nevertheless one which is full of profit both to the individual members of the staff and to the company, where the system is of such size as to warrant it. A man in one department is apt to have narrow views unless he is brought into contact with all the operating staff and is made to see that his department is not the only one on the road. Of course business requirements bring the men together more or less but this is not like a meeting of all the leading men at regular intervals. There are dozens of questions that can be discussed with profit at such meetings.

THE editor who penned the following, thought he had struck the nail on the head: "It is not in evidence that any of these fatalities were due to carelessness on the part of the railway company's employes; the victims themselves have been careless. Still, if there had not been trolley cars they would not have been killed." If there were no beds, people would not die in beds. If there were no boats, nor seas, nor people, nobody would be drowned. If there were no disease, nobody would be sick. If people would look where they are going, there

would be no accidents. If people did not ride behind skittish horses, there would be no runaways. If there were no street railways there would be no progress. So what can we do to please this poor fellow? We can't stop the wheels of progress, nor can we stop the operation of street railways. We can only teach the people to be careful.

WE devote an unusual space for any subject, to a full text of the recent decision by Judge Tuley, of Chicago, in the celebrated case of the Chicago General Railway Company versus the Chicago City Railway Company. The conception of this bold attempt to partially confiscate the tracks of another company has the merit of audacity; just as when a highway robber holds up his victim; but could not from the first be seen to possess any element of right or equity. At the same time the importance of the decision, which affects every street railway in the United States, was evidenced by the more than national attention the case commanded, and the ruling awaited with no little anxiety lest some heretofore unseen flaw might be found to exist. The decision has been made after a long and careful consideration of the law as presented by able counsel on both sides. The promised appeal to a higher court carries little fear that the decision will be reversed. Could the claims of the Chicago General Railway have been sustained the value of the street railway properties in this country would have suffered a loss almost incalculable.

THE idea of providing comforts and conveniences for the men is one now generally recognized in the construction of car houses, and has come with the introduction of mechanical power. In the old horse car days, any small, dark room with hard wooden benches, in some corner of the "barn" which could be utilized in no other way, was usually the extent to which companies felt it necessary to go in providing waiting rooms. Now attractive reading rooms, supplied with good literature, bath rooms, toilet rooms that are built on sanitary principles, and other conveniences go to make up a condition which gives an employe a right to believe the corporation he serves recognizes him as a man. We have in years past visited waiting rooms which in many respects were inferior to that portion of the building devoted to the care of sick horses. There can be no question that a far better understanding of the rights of the other has grown up between companies and their men, and a strike now is becoming as much a rarity as formerly it was frequent. We congratulate both capital and labor on this higher plane into which both are moving, for their interests are mutual and should be so understood and appreciated.

THE recent horseless race in France, in which steam and gas engines and storage battery vehicles competed, has aroused widespread attention. That the near future will witness a practical and in the larger cities, extensive use of such vehicles there can be little question. Of course the first requisite will be good streets and boulevards,

and second, such an application of the motive power as will be unobjectionable both as to odors and noise. In London, a system of electrically propelled omnibuses has already gone into regular service, and a large addition to the equipment is now being made. The Times-Herald, a Chicago newspaper, has offered a prize of \$5,000 for a race between horseless vehicles to take place about November 1, from Chicago to Milwaukee, which will bring out a number of this class of vehicles. In all probability the next five years will develop a no small competition to street cars in the way of self propelled omnibuses and similar craft, which, while more expensive to operate than a car running on rails, will partly equalize that extra cost in their saving on track expenses. They will possess the advantage of being able to navigate on boulevards and streets where tracks cannot gain entrance, and could even deliver passengers at their own residences, but will be unable to make the running time allowed the cars. However, the present lines have little to fear, as the history of transportation is that facilities beget riding.

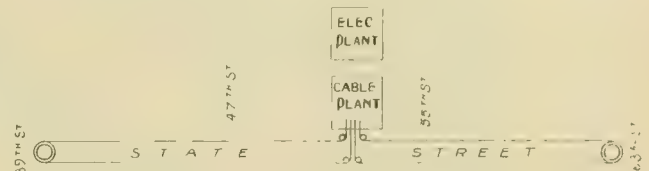
NO ONE knows the strong and weak points of mechanical and electrical apparatus like the men who handle it daily. Would it not be a good plan for those in control of our larger roads to stop once in a while and consider whether the master mechanic usually has enough to say regarding the specified details of apparatus that is bought. There are hundreds of details in the equipment of cars which never receive a second thought on the part of the president or general manager who signs the contracts, but which the master mechanic knows will make a difference in the repair bills when the contract has been filled and the equipment put on the road. These items are not considered by the higher officers for the very simple reason that they do not come under the immediate daily notice of those officers, and being out of sight are out of mind. It is throwing away part of the money spent in hiring a master mechanic not to make use of his advice. It is true that sometimes the master mechanic is not competent to give advice, but that is simply a reflection on the management that hires him. A master mechanic said to us recently: "Our president thinks there is no one like X (mentioning a prominent maker of street railway apparatus.) Now some of X's apparatus is as good as can be got in the market, although if I was allowed to specify some points in its construction, it would be worth much more money to the road. There is also some of X's material that cannot compare with that turned out by other concerns, but our president thinks there is nobody like him and patronizes him for everything that he can. I never see a contract before it is signed. On steam roads there are always clauses filled by the master mechanic, or specified 'as per master mechanic.'" It is to be regretted that the street railway business is not extensive enough to warrant a master mechanics' association, so that some of these details could be discussed and decided on by a body of practical men, as in steam road practice.

ELECTRIC MOTOR DRIVES A CABLE PLANT.

On the morning of July 26, the passengers on the south end of the State street line of the Chicago City Railway had the honor of being the first passengers ever hauled by a street railway cable plant driven by an electric motor. While the majority of them were not aware of the novel experience that they underwent, this fact only goes to show how well the new 700-horse-power Westinghouse motor did its work. Cable roads up inclines been driven by electric motors, but this is the first regular street railway cable to be so driven.

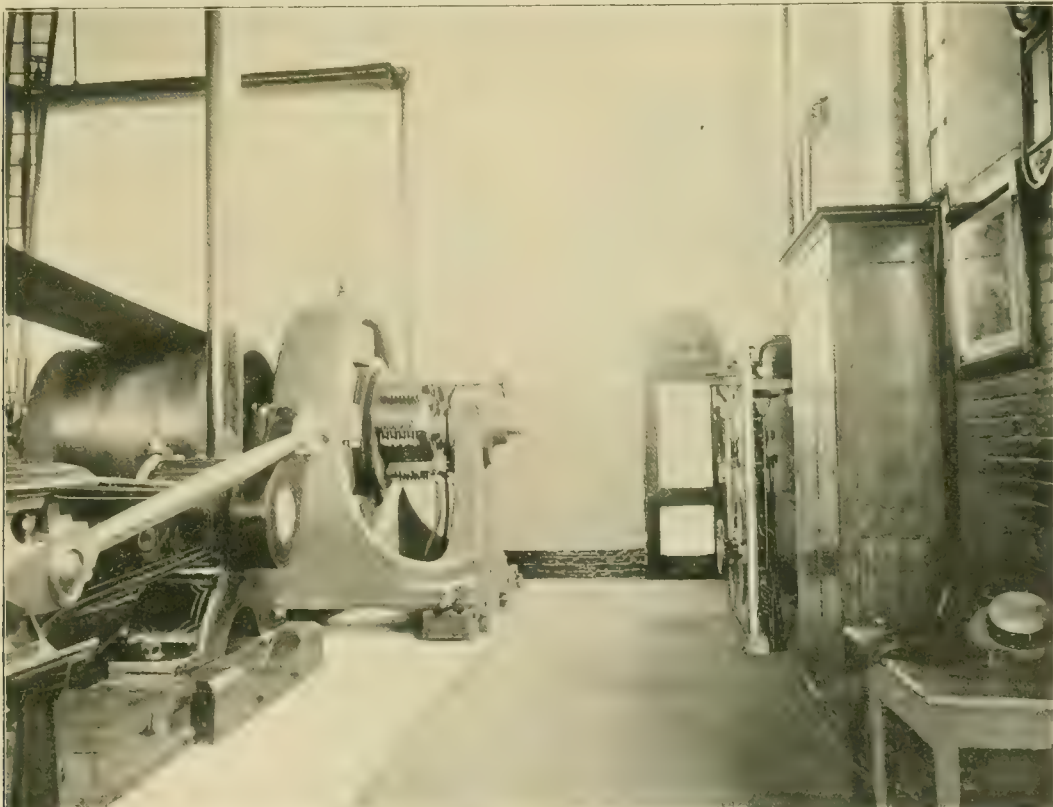
One year ago this month the REVIEW gave the outlines of the plans of the above company for the extensive use of electric power on its system, among which was the project of driving a part of its cables by electric motors driven from the central electric power station. The first cables to be so driven are the two lengths on State street south of Thirty-ninth street, comprising three miles of double track. The motor is put in the cable plant on State street near Fifty-second street, just across the alley from the electric plant. Although the motor has been on hand for nearly a year it has not been put in place and started because of the enlargement that has been going on in the electric plant. As the question has been asked us so many times, what is the economy of such an arrangement, it will not be out of place to recapitulate some of the reasons given in our former article for the change from steam engine to electric motor. At

first thought it would seem that the use of an electric motor and the conversion of the power from mechanical to electrical energy and back again would result in nothing but a dead loss. However it is a repetition of the old story that centralized power generation is cheaper than subdivided power generation. The cost of the fuel for the double conversion of energy, allowing for 17 per cent loss, will probably be from \$7 to \$8 a day. To run the cable motor requires no increase of the pay roll in the electric plant as the power units are so large. The same



is true of oil and incidentals. Practically the only loss then will be the extra fuel mentioned. Over against this is the saving which is due to the closing down of the boilers and engines in the cable plant. The saving in labor resulting from this is \$28. To this must be added the saving in oil, repairs and incidentals which is made when the cable steam plant is shut down. This is figured at \$7 a day, so that the net saving by operating the cable motor is \$28 per day. In other words it is cheaper to generate power in one plant than in two.

The motor has done the work in a perfectly satisfactory manner and there has been nothing so far that would suggest any uncertainty as to the success of the experi-

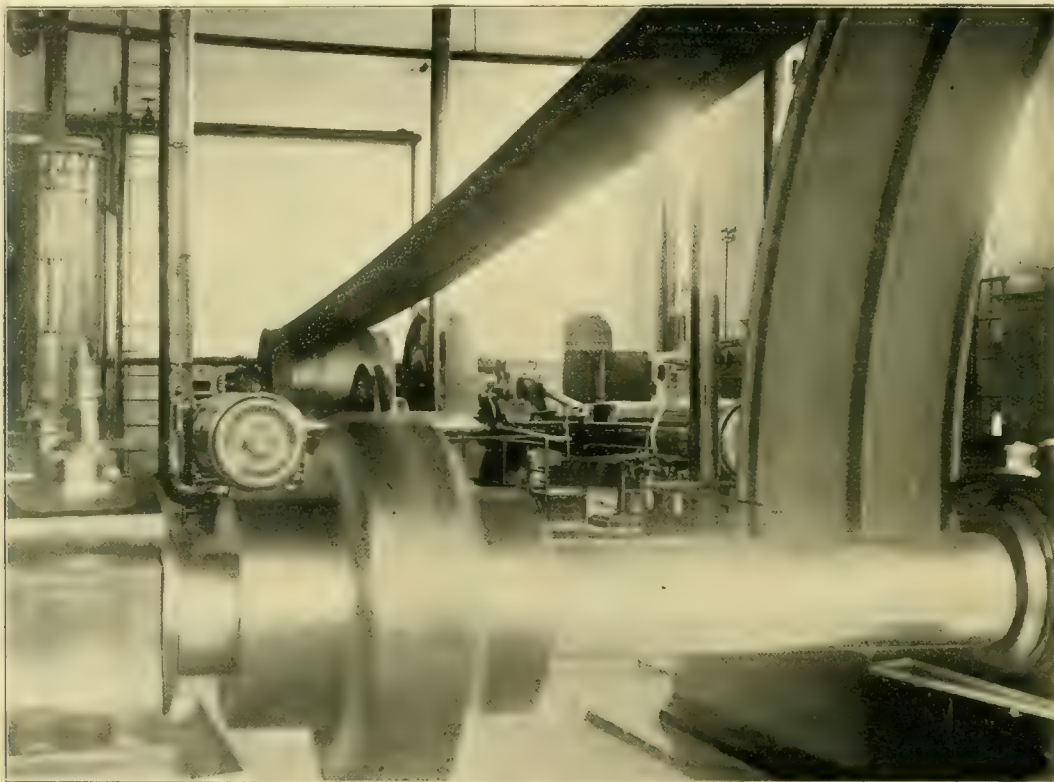


MOTOR DRIVING CABLE—CHICAGO CITY RAILWAY

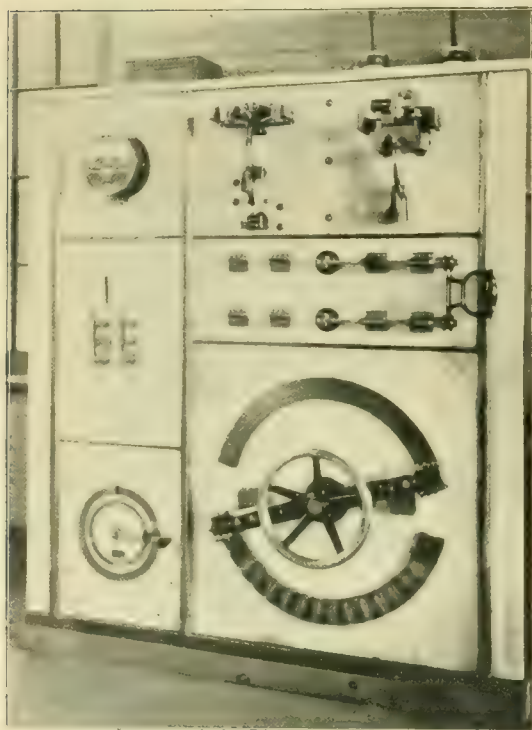
ment. The ammeter shows a great variation in the power required to pull the cable. In fact, the variation is much more sudden and violent than would be the case with an electric road consuming the same amount of power, although it is not nearly as violent as on small electric roads. The motion of the ammeter pointer is

slow but it is nothing uncommon to see it rise or fall 200 to 300 amperes inside of 20 seconds.

The switchboard used with the motor is an interesting piece of work. The motor is shunt wound, and of course a rheostat is placed in the shunt field. As there is danger that the shunt field will puncture the armature insu-



MOTOR DRIVING CABLE—CHICAGO CITY RAILWAY.



SWITCHBOARD FOR CABLE MOTOR

lation by its high voltage discharge due to self induction, when the circuit breaker opens, a non inductive resistance is put in shunt to the fields so that the fields will discharge through it in preference to the armature. This and the field regulating resistance is put behind the switchboard. The motor is started with an iron wire resistance put in a water tank. The resistance is composed of number 12 iron wire wound on wooden spools, and connected three in parallel. The water can be circulated through the tank to keep the wire cool if necessary, but in ordinary starting and slow running, when examining and pulling in new cable, it is not expected that this will be necessary on account of the ample size of the rheostat. The tank is 3 by 3 by 10½-feet. The contact arm and segments for the rheostat are shown on the surface of the switchboard, and they are of course of very heavy construction. It will be seen that there are two circuit breakers. One of these is connected in the main circuit in the ordinary manner, and goes out on a short circuit. The other has its current breaking switch connected in the main circuit, but the magnet which opens it is connected between the first two segments of the rheostat, so that when the motor is shut down gradually with the rheostat, the final break of the circuit is made by the circuit breaker and there is no arc on the rheostat segment. The switchboard also

has a double pole double throw switch for reversing the motors, a double pole field switch and a Weston ammeter. The cable motor is connected with one of the feeder panels of the electric plant across the alley, and is run just as any other feeder.

ELECTRICITY ON THE LOUISVILLE BRIDGE.

We have been taken to task for the statement in our July issue that the Nantasket Beach road was the first standard steam road to adopt electricity as a motive power. While we believe it is true that it was the first steam road to adopt electricity for its entire traffic we are reminded by George MacLeod, superintendent of the Kentucky & Indiana Bridge Company that his road adopted electricity for its suburban passenger traffic, August 25, 1893, and has been so operating ever since. Steam is still used for the freight service. Prior to the date mentioned suburban trains were run by steam on a thirty minute headway. It was rightly decided that by substituting electricity for steam a more frequent service could be given and with a correspondingly increased travel the cost would be reduced per passenger mile. Electric suburban trains are now run every fifteen minutes between the two cities.

The Kentucky & Indiana Bridge Company's tracks extend from First street in Louisville to Vincennes street, New Albany a distance of 4.11 miles. The river is crossed on the company's own bridge which is located at the foot of Thirty-second street, Louisville. The bridge with approaches is a mile in length. The bridge proper is of cantilever design and is 2,453 feet long, having seven spans, of which the longest is 483 feet. The draw span over the Indiana channel is 370 feet. This bridge carries a single track railroad and has a wagon way on each side of the railroad.

Besides this the company controls and operates the Louisville Belt Line, New Albany Belt & Terminal Railway, and the New Albany Railway. The latter is an electric street railway connecting with the suburban trains of the Kentucky & Indiana Bridge Company. Of the 4.11 miles of track used by the suburban trains 2.11 miles is doubled tracked. The remainder comprises the bridge, approaches, and a viaduct, and is single track. The electric trains have to run between the freight and passenger trains of the B. & O. S. W. Railroad and Southern Railway and the switch engines of the bridge company which transfer freight between factories and railroads in New Albany. The electric cars are operated on a regular time card just as the steam trains. The road is operated on a block system. There are ten stations on the line and the schedule time for the 4.11 miles is seventeen minutes. The cars are 28 feet inside measurement, and the motor cars are vestibuled at both ends, and have two W. P. 50 motors. The trolley line is Number 0 carried by span wire construction. The hangers on the bridge proper are the ordinary barn type fastened to the struts by

wooden blocks. The 0000 stranded feed cables are carried over the top of the draw span of the bridge and are supported midway in this distance on a pivoted arm in the center of the span.

During the two years that the electric cars have been running there has never been an accident and only once has an electric train been off the track.

NASSAU COMPANY VINDICATED.

The recent supreme court decision, reversing the ruling of Judge Smith, is a complete victory for the Nassau Railroad, commonly known as the P. H. Flynn syndicate. For two years the company has been constructing a vast street railway system centering in Brooklyn, N. Y. After millions of dollars had been expended and the road was ready for traffic, suit was brought to annul the franchise on the ground that it had been illegally granted.

When the franchise was applied for, in March, 1893, there arose a rival bidder for the same privilege, the Union Street Railway Company. The latter offered \$250,000 and the first applicant a certain percentage of the gross receipts. The Council rejected the cash offer and accepted the percentage bid as being more advantageous to the city. Immediately cries of fraud were made by interested parties and taken up by the people. Judge Dykman, of the Supreme Court, said "There is no cause for the interference of the court upon the ground of fraud, so we find no reason for interference by reason of waste or injury to the funds or property of this city, even according to the most technical definition of those terms."

The road has opened with a good paying patronage as it touches many of the breathing places on the seashore.

WESTINGHOUSE-BALDWIN COMBINE.

Newspaper dispatches has been full of a combination between the Westinghouse Company and the Baldwin Locomotive Works, to perfect and manufacture electric locomotives. Accompanying the report was the announcement that it would only be a short time before all the steam roads would discard their locomotives and adopt electric traction, which would enable them to attain a speed of 150 miles an hour with passenger trains. The inference that most of the dispatches conveyed was that the Baldwin company was getting in out of the wet.

"It may be that there is an affiliation between the two companies," said B. F. Stewart, of the Chicago office of the Westinghouse Company, "but I have heard nothing in regard to it. Both companies are Pennsylvania corporations, and it may be that the Westinghouse Company doesn't care to build locomotive frames, nor the Baldwin Company to build motors. Under these circumstances it would not be unnatural for them to work together."

The Detroit Railway issues books of 100 coupons for \$2 to policemen and firemen.

THE MADRAS TRAMWAY OPENING.

The first electric railway in India was formally opened last month under the auspices of the Madras Electric Street Railway, of which S. A. Chalk is manager and which took over the affairs of the old company. Work was commenced a year and a half ago, and after many minor difficulties this blessing for Madras has been completed. Of course the road is the result of English enterprise, for no native energy would ever have supplied the third city of the Peninsula with this system of transportation. On account of low fares, the new road promises to be a financial success. The poverty of the people is a drawback, but this is in part counterbalanced by their innate laziness and indisposition to walk when fares are low. It is hardly necessary to say that this is the first electric conduit road in the orient, as it is the first electric

usual ammeters and voltmeters and double pole automatic cut-outs. The generators are driven with rope transmission from two horizontal cross compound 180-horsepower engines, working at 120 pounds steam pressure. Two Babcock & Wilcox 250-horse-power water tube boilers furnish the steam, and are supplied through a Berryman heater. C. Gadsby is the present resident electrician. We wish our East Indian friends much success in their new undertaking, and hope it will stimulate similar action in other eastern cities.

BUFFALO AND NIAGARA FALLS CONNECTED BY TROLLEY.

It is now possible to go from Buffalo to Niagara Falls by trolley. At the two cities of Niagara Falls there are magnificent electric systems, which touch all the numer-



road in India, and there is only one other electric road in Asia. The length is $5\frac{3}{4}$ miles of single track. Extensions which will make this figure 7 miles will soon be under way. The line is practically a dead level, and in some places is only 7 or 8 feet above high water. Track laying was all done by natives.

The conduit is similar to that at Budapest, in that it has the slot alongside one track rail. The conductors are steel T rails hung on porcelain insulators. The feeders are lead sheathed and armored cables. All motor cars have a 7-foot wheel base. The wheels are 2 feet 9 inches in diameter. The motors are rated at 10 brake horsepower at 500 revolutions per minute. They are single reduction, using double helical steel gears. The power house is a substantial building, containing two Elwell-Parker generators, giving 240 amperes at 500 volts. Generators make 430 revolutions per minute and have automatic lubricating pumps. The switchboard has the

ous points of interest in this portion of nature's wonder land. W. Caryl Ely, president of the Buffalo and Niagara Falls Electric Railway Company has completed his road, which was constructed by the White-Crosby Company. It has 30 miles of track of 73-pound girder rail in 60-foot lengths, ballasted with stone. John A. Wilson was superintendent of construction. This is one of the longest lines in the country. Every crossing of a steam road has a signal tower with a watchman and automatic device which prevents cars from crossing, if there is a train within 1,500 feet. Traffic arrangements have been made with the Buffalo Railway Company so that all points in the city are accessible.

Five miles of the Niagara Falls & Lewiston Electric Railroad, commonly known as the gorge road, have been put in operation.

METROPOLITAN RAILROAD CONDUIT, WASHINGTON, D. C.

The new electric conduit of the Metropolitan Railroad, Washington, D. C., was put in service July 29. Outward appearances and the cheerful reports of the engineers indicate that it is so far a complete success. Of course it would be foolish to pronounce the plan as an undoubted success until it has stood the test of at least a year, but it is interesting to note the successful inauguration of service on this line. Our readers were given an account of the construction employed in our January issue. The construction of the conduit is practically that of a cable line, except that every 13½ feet a manhole gives access to the porcelain insulators from which are suspended the two T bars which serve as conductors. These conductors furnish a complete metallic non-grounded circuit. They are bonded with "Chicago" bonds.

The line so equipped is the Ninth street branch which comprises eight miles of single track. The equipping of the main or F street branch of the same system with the underground system is dependent upon the success of the Ninth street experiment. The F street line will call for 13 miles more of single track, making 21 miles in all.

The leakage so far has been too small to show on the ammeter and too small to cause any spark when the switches are thrown at the power house. The first ten days that the road was in operation the machinery was run 12 hours per day. Since then it has run to the full limit of 20 hours per day. During this time cars have been added gradually till at present writing there are ten operating at intervals between the horse cars. While it has not been possible to run the trains over the line at full speed (9 miles per hour by police regulation) the motor trains have been speeded over short stretches and up grades without trouble with the underground contact.

Since the road has been in operation several severe rains have fallen. No attention was paid by the engin-



THE PLOUGH.

ers at the time to the depth of water in the conduit, but the part of Four and a Half street over which the line runs was flooded and the conduit showed perfect drainage with no apparent electric leak. After one of these rains the first motor car that ran over the line came back with the "plough" or contact device banked with wet mud clear above the insulation but no difference was perceptible in operating the car. Draining the conduit is accomplished by deep pits at intervals of 400 feet. These pits accum-



POWER HOUSE.



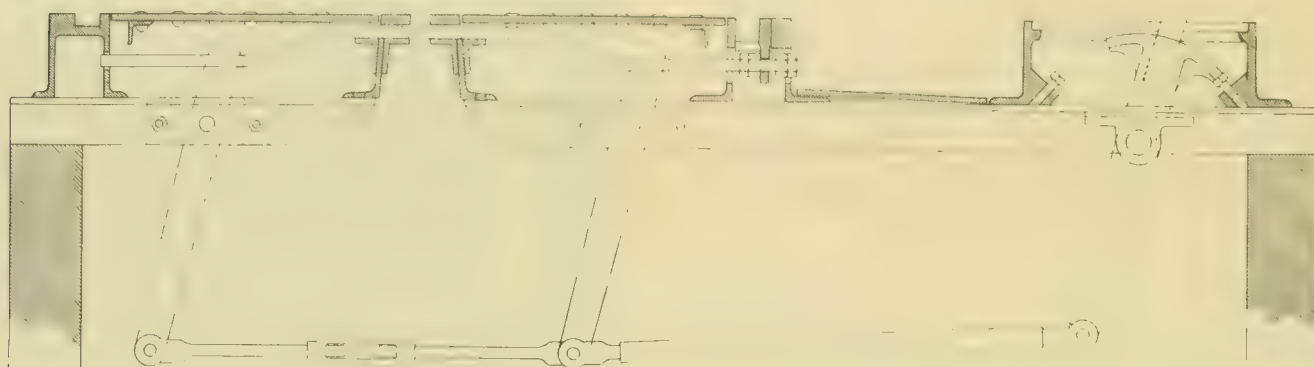
BARN SHOWING CONDUIT.

ulate the sediment and solid matter, and the water is led from them by 12-inch pipes to the nearest sewer.

Only one of the three 400-horse-power Providence engines with which the new power house is equipped is now in use. With no load the plant was run at 450 volts. With the present load the dynamos compound up to from 475 to 500 volts, and with the regular equipment of 22 trains will probably run to 500. The engines are now making 91 revolutions. With 100 revolutions they would

was grounded and the officious individual completed the circuit by fooling with the other conductor bar. This is a very remote contingency.

An interesting feature of the underground construction is the arrangement of the underground conductors at the switches. This mechanism is shown in the accompanying cuts, and may be briefly described as follows: By the application of a lever on the outside of the track three rails are thrown, the two track rail tongues, the



SECTION THROUGH SWITCH AT SLOT SWITCH.

give the regular trolley line voltage of from 500 to 550 and when the line is in full working order they will probably be speeded up to this point.

So far there have been no electric accidents of any sort either on the line or in the power house. On several occasions small boys have tried to have fun with the line by sticking pieces of wire and tin into the slot. The

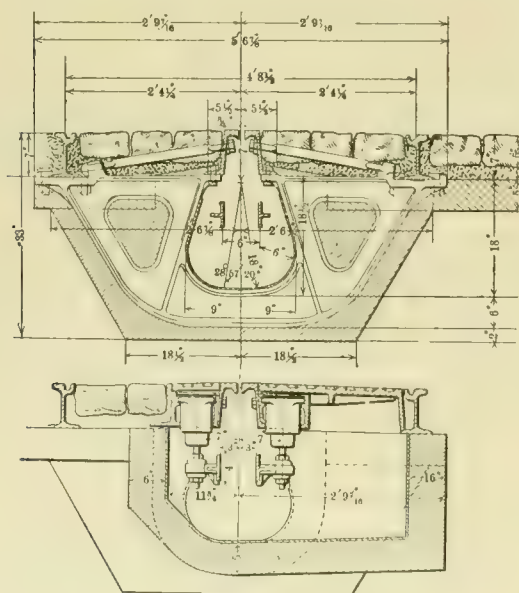
slot rail tongue, and the conductor rail tongue. By two track rail tongues is meant that a switch mate is used instead of a plain mate. This is done for easy riding. On the same rod that the track rail tongues are connected are the pusher bars for the slot rail tongue. A shaft running parallel to the track and six feet long operates the pusher for the conductor rail tongue. This conductor rail tongue is pivoted at the point of the switch, the other end being thrown a distance of six inches which allows it to be placed in line for the shoe contact for either slot, straight or curved. The effect of this is that the car on the straight track has the current through the switch with no break of contact. On the curved track, at the switch end, the shoe on one side slides on a movable conductor rail tongue, and on the other side has no contact for a distance of seven feet, making a break in the circuit for that distance.

An engraving of the underground trolley or plough is shown. The device complete weighs less than fifty pounds. The flat-faced metal block at the bottom makes contact with the face of the conductor rail being held out by means of the broad-bowed steel spring behind it. This is doubly insulated; first by the round rubber washers above and below the centre of the block and second by the oblong rubber blocks into which the metal jaws holding the contact block are hinged on the left edge of the plough.

The trolley conductor sections into which the road is divided are two miles long, there being four in the eight miles of single track.

The company has spent in round figures \$700,000 in equipping its Ninth street line. The total cost per mile of single track has been \$34,742.40 of which one-third was for paving. The cost in detail was as follows:

Asphalt paving, \$7,497.60; track laying, etc., \$2,455.20;



SECTION OF CONDUIT.

current now in use fuses these substances instantly, however, burning off a 3/8-inch iron hook that was thrust against the conductor bars without any injury to the boy who was experimenting. The only chance that appears to exist for an accident even to such flagrant trespassers would be when through an accident one side of the line

first class concrete for tube, \$5,068.80; second class for paving base, \$3,062.40; excavation, \$2,376; bonds finished (average of double and single bonding) \$158.40; malleable iron clips, \$264; insulators, \$264; yokes, manhole covers, frames, etc., \$5,068.80; bolts, nuts, etc., \$792; conductor rails, \$1,267.20; wheel rails, slot rails, and joints, \$6,468.

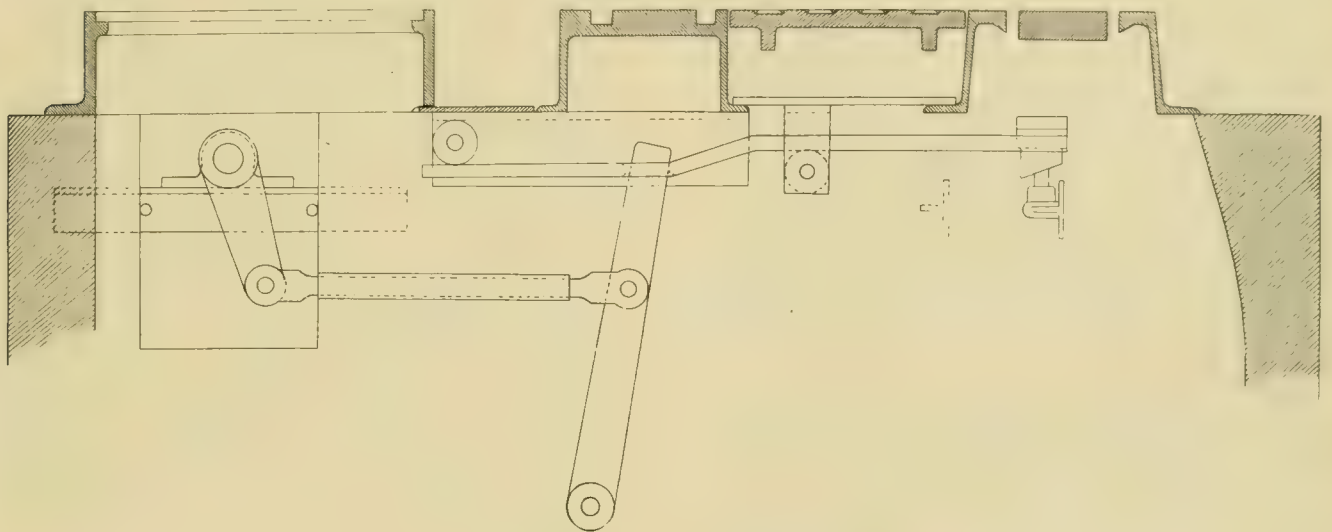
The company is so well satisfied with the working of the Ninth street line, that engineers have already been started over the main line. A contract is now being made to get the rails and yokes at the earliest possible date, and it is hoped to have the main line equipped with the conduit system by Christmas. A. N. Connett, the chief engineer of the Metropolitan Railroad designed, and E. Saxton, the well-known cable contractor, laid the track and conduit.

The full complement of trains will be 22, consisting

ANNUAL MEETING OF THE TRAMWAY'S INSTITUTE.

The Tramways Institute of Great Britain and Ireland, which corresponds to our American Street Railway Association, held its annual meeting in London last month. President W. J. Carruthers-Wain, who will be so pleasantly remembered by delegates to the Buffalo convention was re-elected president for the fourth time. The attendance was as large as usual, but nothing of special importance marked the session.

In his opening address the president called attention to the rapidly decreasing objection to the trolley system, growing out of a better understanding, and that in places where one year ago opposition was strong, the public were clamoring for the change. His reference to corporation worked tramways revealed the fact that at Glas-



SECTION THROUGH SWITCH AT CONTACT RAIL SWITCH.

each of a motor and one trailer. The motor car will have a glass front in severe weather. The couplings between the cars are as rigid as it has been possible to make them. The bull noses are faced off square with each other leaving no play when the coupling pins are in place. This does away with the surging incidental to spring couplings of all sorts. To prevent oscillation in the contact shoe, this device is swung from the truck instead of from the car.

A FINE RECORD.

The best Fourth of July record which has reached us is that of the St. Joe-Benton Harbor road, of which W. Worth Bean is president and manager. With five motors drawing each one trailer,—and the trailers were cars formerly drawn by horses, the road collected 12,309 fares. An extra motor and trailer met with an accident early in the day, bringing the average haul per car for the day to nearly 1,200 passengers; or \$60 per car. We agree with those who bemoan the scarcity of holidays in this country.

gow, Huddersfield, Plymouth, and Leeds the lines are being worked at a loss.

William Neale, chairman of the Birmingham Central tramways reported the use on his lines of steam, cable and horses. Cable was working very satisfactorily, and he would gladly substitute the cable on the steam lines if allowed to do so. His horse lines run at a loss.

The meeting closed with the annual dinner.

LARGE SNOW PLOW ORDER.

What is said to be the largest single order ever placed for electric plows and sweepers has been received by the McGuire Manufacturing Company Chicago.

The recent orders for this popular sweeper are the North Chicago City Railway Toledo Traction Company, Youngstown Street Railway Company, Metropolitan Street Railway, Kansas City, Missouri.

These sweepers were first put upon the market the early part of last year and have proven so successful that they have received duplicate orders from all but one of the companies that used them last year.

NORTHWESTERN ELECTRICAL ASSOCIATION.

The Northwestern Electrical Association met for three days, July 17, 18 and 19, at the Leland hotel, Chicago. Although the membership of the association is not limited to electric light men, it is devoted almost exclusively to electric light interests. The meeting was in most respects a very successful one. The total attendance was large although the number of central station operators was somewhat smaller than would be expected in an association formed in the interest of central stations. One good feature of the meeting was the presence of a large number of independent electricians and electrical engineers.

The acting president, George Grimm, gave some very good advice in his presidential address to all companies operating under municipal franchises. His words were to the effect that the value of a franchise depends so much upon a favorable public sentiment that everything possible should be done to cultivate such favorable sentiment in the community served. The business of such companies is uncertain enough at best and to the natural uncertainties should not be added the liability of unfavorable legislation instigated by an enraged public. Probably the majority of companies are not guilty of a disregard of the public, but there are a few such corporations. The public does not discriminate, and the many suffer for the sins of the few. Coming from a lawyer who is a station manager these words are certainly worth serious consideration by companies depending on the public good will.

A. V. Abbott, engineer of the Chicago Telephone Company, read a paper on "Electrical Interference" in which the influence of one commercial electric circuit on another was discussed and means pointed out to remedy the various cases. Under this head is included the disturbance caused by the ground return of an electric railway. As a telephone engineer who has installed many miles of electric railway Mr. Abbott naturally took an unprejudiced view of the matter. He favored the use of a complete non-grounded metallic circuit by all companies. This of course means the use of a double trolley by the electric railways. While admitting its disadvantages he thought that in the long run, considering the uncertain loss of power in the ground return as usually installed and the damages to pipes, the complete metallic circuit would be cheaper in spite of its first cost.

The place of next winter's meeting will be Milwaukee and the officers now stand as follows: President, George Grimm; first vice president, Pliny Norcross; second vice president, P. H. Korst; secretary, William Goltz; treasurer, John Schuette. Fred DeLand is chairman of the program committee, and the entertainment committee consists of Herman Andrae, O. M. Rau and Walter C. Smith.

The Marion City Railway Company, Marion, Ind., is co-operating with the city in making Matters Park an attractive place to the citizens.

RENEWING STEEL RAILS.

Reference was made in these columns some time ago to a process of re-rolling steel rails, when worn so as to be unfit for service. The process was invented by E. W. McKenna, general superintendent of the eastern division of the Great Northern Railway. A company has been organized under the name of the Pioneer Rail Renewing Company, and the rolling mills of the North Chicago works of the Illinois Steel Company have been leased for this purpose. The process is very simple, and, in brief, consists of heating the old rails to a dull red heat and then passing them through rolls until the worn head has been squared up and given the same shape as that on a new rail. To do this it is only necessary to pass them twice through the rolls. The section of the rail is reduced about one-sixty-fourth. The first pass through the rolls does most of the work of shaping the head. The second is for finishing purposes. The rails are of course increased in length by this process and if the ends are in bad shape after rolling they are sawed off far enough back to make a perfect rail. After rolling all rails are carefully inspected and classified as firsts and seconds as in any other rolling mill. To all appearances the rails are as good if not better than when new as far as the quality of the metal is concerned. The company claims this rolling at a low temperature improves the rail and as the change in section in the renewing process is not enough to require a very high heat the steel is thereby improved. Certain it is that the rail when fractured appears to have a more dense and even structure than a new rail rolled at a higher temperature. The process gives promise of being in time a great boon to railways, as it enables them to get practically new rails from the worn-out ones, and at a nominal cost. Old rails are worth \$8 per ton as scrap. The cost of re-rolling is \$5 per ton so that a road can renew its track with a slightly lighter section of rail for \$13 per ton. The reduction in weight per yard of a 65 pound rail is 2 1/4 pounds.

A HANDSOME COMPLIMENT.

George McIngalls, a prominent waterworks engineer visiting Galveston pays the following compliment:

"I said that Galveston has the best water in the United States. She also has another thing she may well be proud of—one of the best systems of street railway anywhere. I have been about the shops and the barn and I never have met with such uniform courtesy from employes nor have I seen such a contented lot of men. Everything is in ship shape on the line. Colonel Sinclair is a most efficient head of such an organization and handles the men without friction. The service is par excellence."

The Cincinnati Street Railway Company has added another park to its list, having purchased the Chester Park race course, which has been changed into a pleasure resort.

TAXING STREET RAILWAY STOCKS.

Street railway men who were conversant with current affairs of seven or eight years ago will recall the interest that was attached the efforts of Hon. G. Hilton Scribner, of New York City, and president of the Belt road, to resist the taxation of his company's stock in addition to the personal tax already assessed against the road. Mr. Scribner, who is a lawyer of wide reputation maintained, there was no justice in double taxation, and took the case into court where the decision was against the company. He was anxious to take it up to the court of appeals but advice of company's counsel finally resulted in letting the case drop, much against Mr. Scribner's better judgment. Now the New York court of appeals has passed on this same point and ruled that where companies return a schedule of all personal property that a further tax cannot be assessed the stock which represents the money with which the personal property was purchased.

During the discussion of the question at the times referred to, Mr. Scribner prepared, at the request of the American Street Railway Association two exhaustive reports, which constitute the most valued contributions on this point in street railway literature. The decision confirms the argument then advanced by Mr. Scribner.

PENNSYLVANIA'S FOURTH ANNUAL.

The fourth annual meeting of the Pennsylvania Street Railway Association, which is to be held at Wilkesbarre, September 4 and 5, promises to be full of interest. After the routine business has been disposed of, a number of papers will be read and discussed and the general interests and welfare of street railways considered.

The second day will be devoted principally to an in-

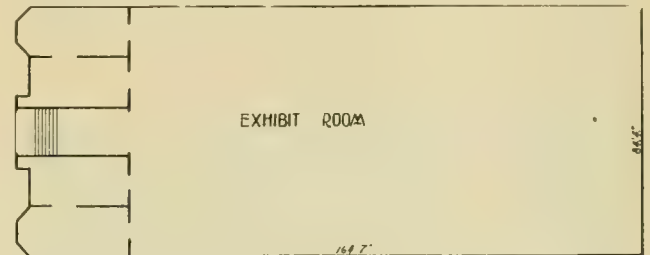
spection of the exhibits made by supply men in the commodious hall of the Ninth Regiment Armory provided for that purpose, and of which we give a diagram and an exterior view. An entertainment and an excursion over the Wilkes-Barre and Wyoming Valley lines will round out the day's enjoyment.

All persons generally interested in promoting the interests of local rapid transit lines are not only invited but earnestly requested to be present at the meeting and participate in its deliberations.

Those desiring to join the association can do so by sending the membership fee, \$25, and one years' dues,



S. P. LIGHT.



\$10, to Secretary S. P. Light, of Lebanon. Supply men are eligible as associate members. Applications for exhibit space may be made to John Graham, general manager of the Wilkes-Barre & Wyoming Valley Traction Company.

I. B. Walker, superintendent of the Sioux City Traction Company, was sadly bereaved by the recent death of his wife from consumption. Mrs. Walker's demise took place at her old home in Salem, Mo. Their child, a daughter, is 2 years old.



THE MONTREAL CONVENTION.

Only two months hence, and the fourteenth annual meeting of the American Street Railway Association, which for the first time crosses the border and gathers in Montreal, October 15th. Indications point to a large attendance. It is very unfortunate that neither the programme nor the plan of exhibition hall is ready and the committees in charge will have to do some tall hustling. Heretofore, the plans of exhibition hall showing spaces to be had have been issued so the exhibitors could select their space several months in advance of the meeting and so have ample time to plan and prepare their exhibits accordingly. The present method of contracting for space is like buying a pig in a poke. A circular has, however, been issued which gives information as to duties, bond, and cost of space in Victoria rink, where the exhibits will be shown. Business sessions will be in another building, directly opposite the rink.

REGULATIONS GOVERNING EXHIBIT.

The Fourteenth Annual Exposition of the Association will open on Tuesday, October 15, and close on Friday, October 18, 1895.

It is the intention to make this year's exhibit the most interesting of any yet seen. A cordial invitation is extended to all manufacturers and producers of street railway supplies to exhibit their machinery and wares.

An arrangement has been made with Mr. M. Davis, customs broker, Montreal, for a reduction in custom house charges on goods to be exhibited as follows:

Warehouse and bond entry.....	\$1 00
Export bond entry.....	1 00
Making and procuring consular certificates.....	1 00

When goods to be returned are of the value of \$50.00 or more, a consular certificate would have to be taken out, which costs \$2.50; goods under the value of \$50.00 require no consular certificate. The fee for the consular certificate is paid to the American consul, and goes to his government; so that no reduction can be made in this. The fees therefore to be paid for goods under the value of \$50.00 would be \$2.00; and \$3.50 would be added to that when a consular certificate is required.

Shippers should mark goods with their own name, and "Care of M. Davis, Montreal, for exhibition purposes," prepaying the freight, and sending invoice marked "certified correct," and signed. On arrival, Mr. Davis will make warehouse bond entry, and have goods delivered at the Victoria Rink.

When the exhibition is over, the owners of the goods will have to repack them, using preferably the same cases that the goods came in, and they will be returned under the export bond. They must be careful not to make more packages of the goods in sending them out than they had in bringing them in, and it is a distinct advantage to have them in the same cases, so that the marks on these cases may be identified. Consignors must pay all freight and cartage.

RULES AND REGULATIONS.

1. Applications for space must be made on blank forms, one of which is enclosed herewith.
2. Space will be allotted on August 1st to all exhibitors whose applications have been filed with the secretary and accepted on or before that date. Applications for space received and accepted after August 1st will be allotted remaining space, if any, in the order of their acceptance.
3. The space will be charged for at the rate of fifteen cents a square foot, and no space less than 50 square feet will be rented, nor more than 1,000 square feet, unless by special arrangement with the secretary.
4. Space allotted cannot be transferred without permission, and must be taken possession of on or before October 9th.
5. Articles placed on exhibition cannot be removed without the written permission of the secretary, except as provided in rule 16.
6. All goods shipped to the exhibition should be plainly marked "Street-Railway Exposition, Montreal, Canada." It is advisable to secure a time limit delivery. Be sure to allow plenty of time for transportation.

7. On and after October 8th, exhibitors and their agents and workmen will be admitted to the building for the purpose of preparing necessary structures.

8. The general reception of articles for exhibition will commence on October 9th.

9. Exhibitors of machinery in operation must have everything in running order, in readiness to start their machinery on the morning of the opening day.

10. All goods intended for exhibition must be on the premises and properly displayed on or before Monday evening, October 14th.

11. Exhibitors must provide all counter shafts, pulleys, belting, switches, switch-boards, etc., necessary for the operation of their machinery.

12. No platform or other structure must be nailed to the floors or walls.

13. Exhibitors must not place any sign or circulate advertisements, except such as pertain to their own business (and those only in their own space), without written permission from the secretary.

14. Electric power will be furnished to those who use power. The charge therefor during the entire time of the exposition will be 45 cents per rated K. W. of machine actually using current. The minimum charge for power will be fifteen dollars.

15. All machinery will, if possible, be exhibited in motion, and should be kept in motion at regular work during the hours 9 to 12 A. M., 2 to 6, and 7 to closing.

16. Sale privileges: Parties desiring to sell and deliver in the building any articles whatever, must first obtain a written permit from the secretary for such consideration as may be determined upon.

17. Any permit to sell may be revoked at any time, at the pleasure of the association.

18. Every possible precaution will be taken to guard against fire, and a full corps of watchmen will be on duty day and night; but the association will not be responsible for loss or damage to articles on exhibition by theft, fire or otherwise.

19. The association reserves the right to charge an admission fee to the citizens of Montreal should it so determine, but the admission of exhibitors and their agents will be free.

HOW TO GO.

For the meeting of street railway men in annual convention, in Montreal, in October, it is proposed on the part of the Lake Shore and New York Central railways to run a solid train from Chicago which will afford connections at Toledo and Cleveland for delegates from St. Louis, Cincinnati, Louisville, and Indianapolis to Montreal leaving Chicago in the morning at about 10 o'clock, and reach Montreal the next night for supper; the route being through Buffalo, Rochester, Syracuse to Utica, thence over the Adirondack Division of the New York Central through the famous Adirondack Mountains. The route is comparatively unknown to western people but possesses, particularly at this time of the year, charms unequalled by any other line. The plan is to join with the New York contingent at Fulton Chain in the Adirondacks and make the run through those forests during the day, which will give an opportunity for delegates to see a part of the country possessing beauties that are not found in any other part of the United States. Details with reference to this trip may be obtained by addressing C. K. Wilber, Western Passenger Agent, Chicago.

This arrangement has been worked out after much study and will give the finest trip between the west and southwest and Montreal that can possibly be planned. In addition, the arrangement will offer every comfort and convenience known to modern travel, making the ride a highly delightful one. The trip through the mountains, in which the Chicago train will be joined with the New York train, will afford a whole day of social gathering

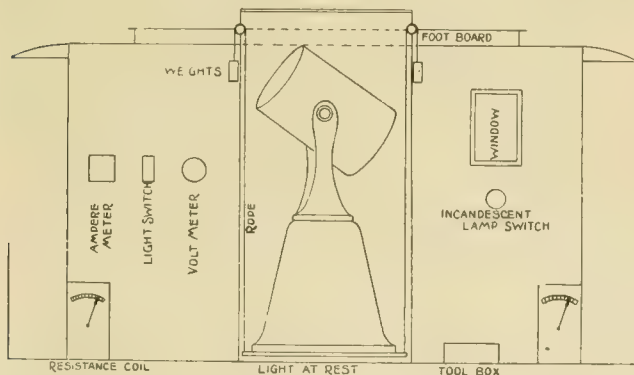
and renewing of old acquaintances of eastern managers, and this alone is sufficient to decide in favor of this route even were one in doubt otherwise. Reports already in show that almost without exception western delegates are choosing the Lake Shore route. Full particulars will appear in our next issue.

JOEL HURT RESIGNS.

Joel Hurt has resigned as president of the Atlanta Consolidated, but this action will in no way affect his duties in the American Association, as the change does not take effect until November. Mr. Woodruff, who is a nephew of Mr. Hurt, will succeed him. The resignation, which causes much regret in Atlanta is the result of a long intended desire on the part of Mr. Hurt to lessen his work and cares, and enable him to devote more time to his personal interests, which are important. Mr. Hurt was induced by capitalists to become president of and conduct the consolidation which was begun in February, 1891, which operation he carried out in a successful and creditable manner, and now having placed the property on a fixed basis, with complete organization, he is anxious to be relieved.

SEARCH LIGHT AS AN ATTRACTION AT LEAVENWORTH.

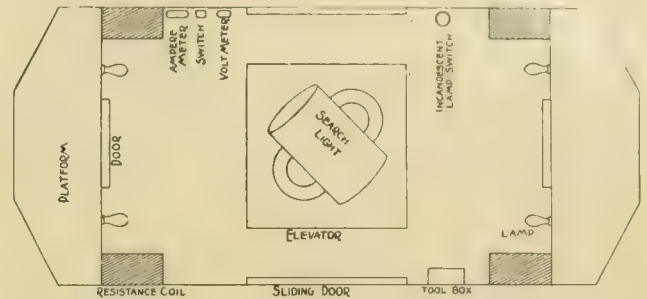
L. M. Erb, manager of the Leavenworth Electric Railroad has made use of the searchlight as an attraction with great success. His method is we believe entirely novel. Instead of permanently placing the light at some particular place it is mounted on a car. The advantages of having it so mounted are apparent. When a light of this kind is permanently located it soon becomes an old story, and besides this when located at a fixed point people soon get so that they do not care to go to the place where the searchlight actually is as they can see from a distance. When the light can be moved so as to offer attractions at various points on the system there is more chance of attracting a crowd for every exhibition.



The change in location has a great deal to do with bringing people out.

The searchlight used is 30 inches in diameter and was one of those on top of the Manufactures Building at the World's Fair. It is mounted in a car of its own and as

shown in the drawings is placed on an elevator so that it can be hoisted above the level of the roof. Current is



taken from the trolley and reduced to 50 volts by a rheostat. The current taken by this light is 50 to 60 amperes.

August 7 was the first night on which it was exhibited and a balloon ascension and parachute drop was



SEARCH LIGHT IN ACTION.

made by its light. The event was well advertised in the daily papers and took place at Fort Leavenworth. Fully 4,000 people were present of which 3,000 rode out on the electric cars for a 15 cent round trip fare.

Mr. Erb also had another object in putting the searchlight on a car. The cost of the outfit was such that it would be impossible to get it back on Leavenworth traffic. Accordingly it has been rented to several other roads and in this way Mr. Erb hopes to get a fair return on the investment as well as enable his brother managers

to secure an attraction. The car is soon to be shipped to Denver where it will fill an engagement at Manhattan Beach. It will then go to Washington Park, Kansas City. It will not be strange if the car is kept busy for the rest of the season. In shipping it is loaded onto a flat car and when it arrives at its destination is put on the street railway track and taken wherever wanted. The light can be hoisted and put in operation in three minutes.

STEEL MOTOR AT OMAHA.

The Steel motor has been doing wonderful things at Council Bluffs, on the Omaha & Council Bluffs Railway & Bridge Company's line. On the occasion of a school picnic held there June 27th, one of the Steel motor cars that has been doing service on the bridge for some time

satisfaction expressed at the recent announcement that a certain dummy line was to be transformed into an electric road.

The experience of Birmingham is that electric cars are cleaner and more comfortable than the dummy coaches; the time made is about the same, and so is the proportion of accidents."

CONSOLIDATION IN PENNSYLVANIA.

New companies are forming in Philadelphia and Pittsburgh to consolidate several lines of street railway in each city. The largest company will comprise the Peoples, Electric and Philadelphia Traction Companies, of Philadelphia, in the Union Traction Company with \$30,000,000 capital. The new company will control 347 miles of electric and 34 miles of cable line. Stockholders have



A LONG HAUL.

was coupled to a train of nine heavily loaded trailers. The big motors sailed through at 20 miles an hour on the level and mounted a 4 per cent grade 500 feet long. Reserve motive power was in readiness at this grade but the motor proved not to need it. The motor and its long train attracted universal attention all along the street and Manager Dimmock was proud of his load. George W. Henry, western agent for the Steel Motor Company, was present and of course was greatly pleased to see the machines he sold standing up to their work as they did.

GOOD SERVICE IN BIRMINGHAM.

The Age-Herald, of Birmingham, Ala., has these good words for the electric road in that city:

"When trolley cars were introduced in this city there was a great deal of prejudice against them. All sorts of terrible things were predicted. But the cars went on the even tenor of their way, with an accident record no greater than that of the familiar and favorite dummies. The service improved from time to time, and there was a decided reaction of sentiment. This was apparent in the

the privilege of subscribing to stock at the ratio of $77\frac{1}{2}$ shares of new stock for 100 shares of the old stock. John Lowber Welsh, president of the People's Traction Company, will be president of the Union Traction Company. The incorporators are:

P. A. B. Widener, William L. Elkins, Thomas Dolan, Joseph B. Altemus and James McManes, of the Philadelphia Traction Company; John Lowber Welsh, William H. Shelmerdine and Caleb Fox, of the People's Traction Company and Jeremiah J. Sullivan, Alfred C. Smith and Alex. M. Fox, of Electric Traction Company.

The Consolidated Traction Company, Pittsburgh, has been incorporated with \$150,000 capital, by C. L. Magee, George W. Elkins, William Flinn, George Sheppard, George I. Whitney and John M. McBride. It is said the new company will include the Du Quesne, Fifth avenue, Center avenue, Wylie avenue lines and Ft. Pitt Traction Company.

Two years ago the trolley cars reduced daily traffic on Kings County L, Brooklyn, from 50,800 to 39,650 passengers.

STREET RAILWAY PLEASURE RESORTS.

THIRD ARTICLE.

Guard Against Accidents.

The recent accident at the Paul Boynton "chutes" in this city whereby nineteen people were injured, four of whom have since died, is a warning to operators of pleasure resorts to use every effort to anticipate and guard against accidents. The chutes which were last season, and so far this year, immensely popular, consist of long chutes in which a boat filled with passengers slides at tremendous speed down the steep incline into an artificial lake. To regain the top passengers were drawn up the incline on an iron track in a car. The disaster occurred by the breaking of a cable through failure of the engineer to stop the machinery when the car loaded with passengers reached the top of the long incline. A second cable, with counterbalancing weight, or a rack in the track with a dog at the rear of the car would not have involved any expense worth mentioning and would have saved life and what promises to be a lot of big damage cases. Safety appliances have now been provided, it is announced, but can never undo the loss to life and limb, and apparently come too late to restore the public confidence for this season, at least.

Those street railways which are operating resorts where any serious accident is one of the possibilities should lose no time in adopting safety precautions.

The Hartford & West Hartford Horse Railway Company maintains a park.

The Schuylkill Electric Railway Company, Pottsville, Pa., has been having variety shows at Tumbling Run.

The Bangor Public Works Company, Bangor, Me., has laid a track to Maplewood Park, which is proving a paying investment.

The Second Avenue Traction Company, Pittsburg, has bought 43 acres of wooded land near Glenwood, which will be made into a park.

The Hartford Street Railway Company, Hartford, Conn., has laid out a park in the village of Rainbow, on the bank of the Farmington river.

The Anderson Street Railway Company, Anderson, Ind., has given a 30-acre park to the citizens. More than 6,000 persons attended the opening.

The Camden, Gloucester & Woodbury Railway Company, Gloucester, N. J., has worked up a good business in carrying trolley parties to Washington Park.

The Danbury & Bethel Horse Railway Company, Danbury, Conn., is laying out a park at Lake Kenosia, which will be opened to the public next season.

The Ft. Wayne Electric Railway, Ft. Wayne, Ind., advertised a concert in Cantilever Park, by ringing bells attached to a car, which made the circuit of the lines.

Visitors to Atlanta last October will not forget the barbecue, which was held at Ponce de Leon. This resort is owned by the Atlanta Consolidated, which has had a series of entertainments this season. Tickets were given to patrons of the cars, but others were required to pay 10 cents.

The Lowell & Suburban Railway Company, Lowell, Mass., had a novel attraction at Lakeview Park. A fin back whale, 55 feet long, and weighing about 4 tons was placed on exhibition. It was caught off Provincetown, and twenty-five barrels of embalming fluid were required to preserve it.

The Meriden Street Railway Company, Meriden, Conn., makes a specialty of trolley parties to Wallingford. On the return a stop is always made at the company's park, where the switch back railway and a steam riding gallery, made by the Armitage-Herschell Company, North Tonawanda, N. Y., are patronized.

The New Jersey Electric Traction Company, Paterson, N. J., asked for suggestions for a name for its new park. More than 300 different names were received, and it was decided to call it Idlewild. Rustic bridges, pavilions, and other buildings have been built, and a steam riding gallery made by the Armitage-Herschell Company, North Tonawanda, N. Y., purchased.

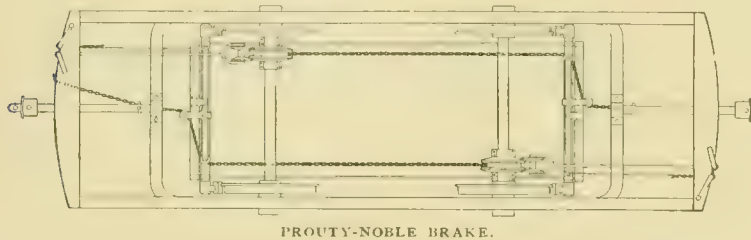
The Kankakee Electric Railway Company, Kankakee, Ill., has a theater at its park which will seat 1,000 people. One week the company offered three prizes, giving the people who bought theater tickets numbered tickets. Certain numbers called for the prizes. The plan worked well and C. H. Cobb, manager of the company, says he believes the plan draws additional people.

The City Dads of Terre Haute, Ind., issued an order prohibiting Russell B. Harrison from holding entertainments. Mr. Harrison bought a tract of land, and built a park of his own. He has made it so attractive that he has more people in his park than go to the city park. Among the entertainments was the Kilpatricks, trick bicycle riders, whose act is described in this issue.

The Utica & Mohawk Railroad Co., Utica, N. Y., has spent considerable money to make Utica Park an attractive spot. That the expenditure has not been in vain is proven by the books of the company, which show that there is a large amount of traffic to and from the park. There is an animal house, half-mile track, with double decked grand stand that will seat 1,200 people, pavilion, and many amusement features, including a steam riding gallery made by the Armitage-Herschell Company, North Tonawanda, N. Y.

PROUTY-NOBLE AUTOMATIC BRAKE.

The Prouty-Noble automatic car brake, which has been in regular operation on a West Chicago car for several weeks, was given a demonstration and most rigid trial on August 8, the guests having the car turned over to them to operate, and running about 20 miles. The test was made on the Cicero & Proviso tracks, and the party included Master Mechanic Bridges and Superintendent Fuller, of the West Chicago road; Superintendent Bowen and C. E. Hall, of the Chicago City; Hon.



Geo. R. Davis, who was director general of the World's Fair; City Electrician Barrett, Alderman Noble, the inventor, Mr. Prouty; the editor of the REVIEW and several others.

Our illustrations shows the brake as applied to single cars and trailers.

The brake is extremely simple and utilizes the present brake rods, beams and shoes. As the parts are made in halves they can be applied without removing the wheels or car body; renewals of course the same. As many trailers as desired can be operated from the motor car by simply hooking a chain from one car to the next.

On one end of each axle of the motor car is placed a loose reel with a chain attached to connect with the brakes of the motor car and trailers. On one end of this

feet distance from the time the driver has thrown the impinging spool.

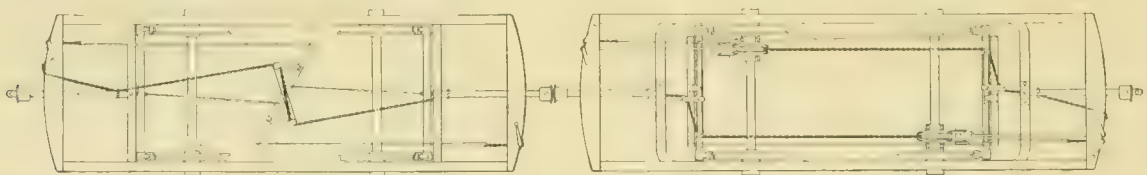
Among the tests made were the following. Running at full speed current cut off and brake applied as front end of car reached a cross street bringing car to an easy stop before rear of car reached opposite side. Full speed run on down grade; full stop in one and a half car lengths or about 45 feet, with car at standstill and brake fully released, current and brake thrown on simultaneously car moved only eighteen inches in winding up chain and applying brake shoes full power.

The brake works equally well in either direction of car and same from both platforms. Not once during the two hours test were the wheels locked or skidded, although each of the party tried his hand at running the car; and while many of the stops were very quick and made under high speed there was an entire absence of any surging, or jerking, or pitching forward of passengers.

Its advantages may be briefly summarized thus: Not expensive and easy to install; instant action without jar or jerk; absolute freedom from wheel skidding; releases instantly and without noise or jerk; applied with very little effort on part of motorman. This last is by no means least, as managers realize the mental strain on a man operating a car all day at high speed, which is greatly increased later in the day by physical exhaustion from working a hand brake. In our judgment the brake possesses great merit.

MADE A GOOD RECORD.

G. T. Rogers, president of the Binghamton Railroad Company, Binghamton, N. Y., has made a record of



reel is a disk collar fixed firmly to the axle; on the other end is a similar disk which is caused to revolve with the axle by the aid of a feather-key, but is also capable of a lateral movement. The outside faces of these disks are slightly beveled to admit of a vice-like impingement by a spool-shaped wheel, which is connected by a rod to a staff and handle within easy reach of the right hand of the driver. A slight touch of the hand sets this spool on the bevels of the disks, which brings them together with vice-like force on the disk faces of the reel, causing it to revolve with the axle and wind up the chains, thus setting the brakes. A service stop is made by setting up the disks lightly, which are constructed to yield gradually; or emergency stop is made by forcing the impingement, pulling on the brakes with great force within two

which any street railway man would be proud. During the year the road has increased its gross earnings 17 per cent. The gain in net earnings from operation, including taxes, was 23 per cent. The percentage of operating expenses to earnings for the past year was 57 5-6 per cent. These results have been accomplished with the same trackage, under the same conditions and in the face of the prevailing financial depression and the most severe winter the road has ever experienced. In his report for 1894, Mr. Rogers predicted the receipts would be \$125,000. The receipts for 1894 were \$108,710, and the stockholders were inclined to think he was too sanguine. The report showed for 1895 gross receipts, \$127,483.61; operating expenses, \$73,716.48; taxes, \$3,247.40; net earnings, \$50,519.73.

TRACKS ARE PRIVATE PROPERTY.

Judge Tuley Holds that Chicago City Railway Has an Easement in the Street by Virtue of Its Ordinance and Contract With the City, and That Its Rights Cannot be Taken in Whole or in Part Without Compensation.

As was indicated by the REVIEW, the Chicago City Railway Company has won the first outpost in the legal battle begun by the Chicago General Street Railway Company, growing out of the attempt of the latter company to run its car over certain tracks on Twenty-second street, Chicago, and the destruction of the car by employees of the Chicago City Railway Company.

On August 10 attorneys for the Chicago General Company appeared before Judge Horton, who gave them until October 5 in which to appeal.

The main points of the decision are:

That the City Railway Company, did not, by placing its rails and roadbed in the public street, make them a part of the street subject to be used by the complainant as one of the public. That although the rails became subject to be used by the public in crossing to and fro over them and by driving lengthwise upon them in a manner so as not to interfere with defendant's use of them, they did not become public property, but remained the private property of defendant company. That by virtue of the ordinance and its acceptance and action thereon, the defendant obtained a valid and binding contract with the city and an easement in the street. That this easement and the rails with the right to use and run thereon passenger cars specially adapted to the rails were property rights of which the defendant could not be deprived, in whole or in part, except upon just compensation to be ascertained (and paid) in the manner prescribed by law.

The complainant could not under the ordinance use the defendant tracks until it made such just compensation.

That while the court was of the opinion that the legislature could authorize the taking in part, the use of the tracks of one railroad by another and noncompeting railroad, upon making just compensation, yet it was doubtful whether the city could authorize this to be done unless its charter expressly gave it such authority; that the present city charter contained no such express authority. The court held that "the authority giving complainant the right to connect with defendant tracks meant a physical connection, and could not be construed to authorize it to operate its cars upon the defendant's tracks."

Following is this most important decision in full:

IN THE CIRCUIT COURT OF COOK COUNTY.

Chicago General Railway Co., et. al.	} Bill of Injunction.
vs.	
Chicago City Railway Co.	

DECISION RENDERED AUGUST 2, 1895.

Tuley, C. J.: The complainant, the Chicago General Railway Company, as the assignee of, and successor to

the other complainant, the West and South Towns Street Railway Company, filed their bill herein seeking a decree against the defendant to the effect that complainants have a full and perfect right to operate their cars along and over defendant's horse railway tracks in Twenty-second street, from Jefferson street to Grove street, in Chicago, without the interference of defendants; and for a permanent injunction against defendants, restraining the defendant company, its officers, agents, etc., from any such interference, and from doing any injury to the complainant company's officers, agents, etc., or their property, in the operation of their cars over said route.

It appears that the defendant company was incorporated under an act of The General Assembly of this state, entitled "An act to promote the construction of horse railways in the City of Chicago," approved February 14th, 1859, and on the 5th of February, 1887, the City Council of Chicago, by ordinance, authorized the defendant to lay down, operate and maintain a double track railway from the center of State street to the south branch of the Chicago river, upon certain terms and conditions, among others, that the company shall fill, grade and pave, and keep in repair sixteen feet of the center of the street so occupied, as provided by a general ordinance of said city, and also as to a license fee or tax per car, it would conform to ordinance passed July 30, 1883, concerning street railways.

The complainants were duly incorporated and in 1892 the Towns Street Railway Company obtained an ordinance from the City of Chicago authorizing it and its successors and assigns to construct, maintain and operate a street railway on (among other streets) Twenty-second street, from the east line of Grove street to the west line of Jefferson street (the 300 feet west of Grove street being over the same route the same 300 feet embraced in defendants' ordinance), which ordinance contained a section which complainants allege authorized them to use and run their cars upon the rails of that part of defendants' road laid upon Twenty-second street for the distance of 300 feet west of Grove street.

In the year 1892, certain negotiations were commenced between one Bowen connected with complainants, and the legal counsel of the City Railway Company, for the operation of the complainants cars on Twenty-second street east of the Chicago river, but they were of an indefinite character and of no binding force. In 1894, Mr. C. L. Bonney, vice-president of the General Railway Company, commenced negotiations with the object of obtaining consent, or a contract, for the operation of cars over the defendant's tracks on Twenty-second street. It appears that there was a bridge at Twenty-second street, and that the approaches to the same were insecure. These were strengthened by the city at the request of the General Railway Company, and that it paid about five-eighths of the costs and the defendant company about three-eighths. The tracks of the General Railway Company were laid over the bridge, to the east end of same, and the defendant company relaid its tracks on

the east approach, and so as to make an apparent connection with the complainants' tracks.

No proposition for a contract or for running arrangements between the complainants' companies and the defendant company were ever made to the board of directors of the latter company, nor does it appear that the counsel for the defendant had any express authority in the premises. All attempts at obtaining some running arrangements were fruitless, and after several months' effort in that direction, all negotiations were broken off. Thereupon, certain officials of the General Railway Company, after several flamboyant published interviews as to their intentions and the rights of their company, apparently determined to put to the test their rights to run cars upon the tracks of the City Railway Company. Having publicly announced a "street car party" to test their right to run cars on defendant's tracks, on April 4th, 1895, one of their cars was run across the bridge and down the east approach on to the defendant company's tracks. The defendant company's agents and employes violently attacked the car and with axes and crowbars, totally demolished the same. Thereupon this bill was filed for an injunction.

This Court is not called upon to express an opinion as to the conduct of the defendant company in destroying the complainants' car, as this is not the forum in which (for that act) complainants must seek redress. This Court can only consider that act of defendant company as a circumstance tending to show the intention of defendants to make all the resistance it can, to any attempt of complainants to exercise the right claimed by them to operate their cars over defendant's tracks.

After a careful consideration of the evidence touching the "negotiations" referred to; the repairing of the bridge approach; as to the laying of the tracks on the bridge and its approaches; the payments made for the cost thereof, and other evidence tending to support complainants' contention that thereby the defendant became estopped to question the right of complainants to operate their cars along Twenty-second street, in accordance with the authority granted by said ordinance to complainants; the Court is of the opinion that the evidence is too indefinite, and is insufficient to support that contention.

The proof failing to show any consent of defendant to the use of its tracks, or any leases or contracts between the parties, and there being no estoppel in pais upon the defendant, the question remains, what right, if any, has the complainant to compulsorily run its cars over defendant's tracks laid upon Twenty-second street.

The Court is of the opinion that the General Railway Company has succeeded to all the rights of the West and South Towns Railway Company, therefore the question now is as to the rights of the General Railway Company.

One contention of the complainants is, that they have the right to run their cars over defendant's tracks without defendant's consent, because under Section 12, Article 11, of the State Constitution, all railways constructed in this state are "declared to be public highways, and shall be free to all persons for the transportation of persons

and property thereon under such regulations as may be prescribed by law."

If the true construction of this provision is, that railway tracks and right of way become public highways in the sense that a road or street is a public highway, which any person can use with any vehicle that he thinks proper, then there was no necessity of complainant's obtaining either a legislative or municipal act in order to exercise the right of running cars on or over defendant's tracks, whether the same were laid on a street on defendant's private property. The court cannot conceive how it can be seriously contended that such is the true construction of the constitutional provision. It is doubtful whether the constitution added anything to the law as to railways being public highways. They were so adjudged to be long before the constitution of 1870 went into effect, and our Supreme Court has construed said provision of the constitution as making railways public highways "only so far as owners and operators are subject to the duties of common carriers. (T. P. & W. R. Co. v. Pence, 63 Ills. 524. See also Hoyt v. C. B. & Q. R. R., 93 Ills., 601.) Nor can it be perceived how this provision added to or gave municipalities any special power over railways, as public highways, which they did not heretofore possess.

The complainants rely also on the constitutional provision, Art. 2, Sec. 14, providing that "No law * * * making any irrevocable grant of special privileges or immunities, shall be passed." The constitution of the United States uses these words: "Privileges or immunities," in Sec. —, Art. 4, in declaring the rights of citizens of one state in the several states of the Union, but the meaning of these words has not been conclusively settled. (Cooley Con. Lim., Sec. 396.) The provision has been held by our own Supreme Court as not to prohibit a municipality granting the use of streets for railroad purposes and annexing conditions thereto.

It is true that rails and roadbeds in the street are, as well as the cars, property affected with public use, in that they are a part of the machinery for the transportation of all persons who may desire to be carried, but this does not make such property a part of the highway, or confer ownership upon the public. It may as well be said that the public own the public grain warehouses, because every member of the public has the right to have grain stored in them at a reasonable price, and under reasonable rules and regulations.

Mr. Cooley says: "There are cases in which the State may grant privileges to specified individuals without violating any constitutional principle, because, from the nature of the case it is impossible they should be possessed and enjoyed by all; and if it is important that they should exist, the proper state authority must be left to select the grantees. Of this class are grants of franchises to corporations." (Cooley, Sec. 394.) If we concede complainants' contention upon this point, it does not follow that the city could repeal, in a whole or in part, an ordinance granting a privilege to lay tracks in a street without making compensation for the injury done by such repeal.

It appears also to be a contention of the complainants, that as the city owns the fee of the street, if any one puts a rail down in the street and affixes it to the freehold, it becomes a part of the freehold, and as the freehold belongs to the public, the rails that he affixes, belong to the public, and therefore that complainant, as one of the public, has the right to use the rails so laid in the street; that such rails become as much a part of the street as the wooden block pavement laid therein.

While the presumption of law in the absence of proof, is that the city owns the fee of the street, yet as a matter of fact it does not in many cases. It acquires streets in various ways, by purchase, gift, condemnation, dedication, statutory and common law; and it often occurs that different parts of one street are acquired in several, if not all of said methods. In such case, if the contention of complainants could be sustained, the city would own and the public have the right only in those sections of the rail under which the city owned the fee, and private owners of the fee in the remainder of the street, the balance of the rail. So far as the question at bar is concerned, it makes no difference whether the city does or does not own the fee of the street. The power and right of the city to control and regulate the streets of the city is just as great where it acquires the perpetual use of the street by common dedication, as where it has acquired in any way the fee. In either case it holds the street in trust for use as a street, and the public as to transportation or passage or user of same, have the same rights in one case as in the other.

It is clear that whatever right the complainant has to use the defendant's track, it must derive from the ordinance granted it by the city council.

What are complainants' rights as to the use of defendant's track under the ordinance? Such inquiry necessarily involves the questions:

1st. As to the power of the council to confer on complainant the right to use defendant's track. It must be admitted that under the general power conferred by the city charter to open, lay out, establish, etc., to control, regulate and improve streets, together with the express power given as to railroads by the 24th and 90th clauses of section 63, article 5 of the charter of the city, it has ample power to grant to a railroad company the right to lay down and operate horse railway tracks in the streets of the city. Clause 24 authorizes the city to permit, regulate or prohibit the locating, constructing or laying a track of any horse railroad in any street * * * with proviso limiting the time to twenty years. The 90th clause prohibits the city from granting a right to lay down any railroad track in any street of the city, to any steam, horse or other railroad, except upon the petition of the owners of the land representing more than one half the frontage, etc. These charter provisions give no express power to grant the use of the tracks of one horse railroad to another horse railroad.

It seems to be settled that without legislative sanction the city cannot, under its general power, grant the right to lay down and operate horse railroads on the public

streets. That the city cannot authorize one company to take the entire track of another railroad company must be admitted. The supreme court declined to express an opinion whether the legislature itself could do this, even upon making just compensation. (81 Ills., 424.) I am of opinion that where the railroads are not competing roads, and the public necessities require it, the joint use of a part or section of a railroad track might be so taken if such taking did not materially interfere with the operations of the road whose tracks are so taken, but I doubt the power of a municipality, without express legislative authority, to pass an ordinance authorizing such taking.

Admitting, however, that the city has this power, has it exercised it by the grant contained in the ordinance passed in favor of complainants in 1892? The supreme court of Illinois holds, that in the absence of a clearly expressed intention to the contrary, the courts will not construe a railway charter so as to authorize one company to take the property of another already devoted to a particular public use, for the purpose of applying it to the same public use. (C. & N. W. Ry. Co. v. Chic. & E. R. Co., 112 Ills. 598.)

A like rule must prevail as to the construction of an ordinance. Sec. 13, of that ordinance provided, "Sec. 13, Said company shall have the right to connect its tracks with those of the Chicago City Railway Company, on Twenty-second street at or near Grove street, but shall have no right to construct any tracks east of the Chicago river on said street, without the consent in writing of said Chicago City Railway Company. Said company shall also have the right to operate its cars over tracks not owned by it, upon such terms and conditions, by lease or contract as may be agreed upon between the companies owning such respective tracks, or otherwise, not in conflict with any of the conditions of this ordinance, or the general ordinances of the city," with a provision added, that not to exceed five cents should be charged for one continuous ride over the lines over which the company should operate its cars within the city limits.

Complainants allege that it obtains the right to use the defendant's tracks by a clause giving it the right "to connect its tracks with those of the Chicago City Railway Company on Twenty-second street." Under the rule of construction laid down in 112 Ills. is this position tenable?

Laws giving railroads the right "to connect," "to join," "to unite," their tracks with those of another railroad, have been construed in several cases by courts of last resort. In the 121 Ills., the question, was as to the rights conferred by a charter authorizing the company "to cross, intersect, join and unite with any other railroad." The court held that these words did not authorize or require the railroad companies to join in the use of such property as might be necessary to accomplish the purposes of both railroads, and that the terms "join and unite as used, were clearly intended to authorize merely the bringing together and the forming of a physical union or connection between the tracks of the proposed road and that of the one already built." (Ills. C. Rw.

v. C. B. & Q. R. R. 121 Ills. 483.) Among other cases to the same effect, see A. T. & S. F. R. R. v. B. & O. R. R. 110 U. S. 675.)

This brings us to the discussion of the rights acquired by complainant to use the tracks of defendant by virtue of the provision in section 13. "Said company shall also have the right to operate its cars on tracks not owned by it, upon such terms and conditions, by lease or contract, as may be agreed upon between the companies owning such respective tracks or otherwise." The complainants have no consent, lease, or contract, but contend that under the terms "otherwise" they can compulsorily exercise the right to use the tracks of defendant company, and it follows, of any other company also.

The word "otherwise" means "another and wise manner," "in a different manner." This necessarily implies other legal manner. If just compensation has not been made, and is a pre-requisite to the exercise of the right given by the ordinance, and there is no consent or contract or estoppel upon the defendant, then the complainant, in its attempt to run its cars on defendants' tracks, was a mere trespasser. The term "otherwise" cannot be construed as giving the right to commit a trespass.

Admitting the validity of the ordinance, can the complainants exercise the power granted to use defendants' tracks without first making just compensation? This involves the question whether or not defendant has any property rights or interests which will be taken or damaged by the exercise of the authority granted in complainants' ordinance. It is provided in the bill of rights (which may be said to be the soul of the constitution) that, "private property shall not be taken or damaged for public use without just compensation; compensation when not made by the state shall be ascertained by a jury in the manner provided by law."

Has the defendant, by laying down its tracks and operating its railroad thereon, under the ordinance granted it in 1887, acquired any property rights or interest which will be taken or damaged by a joint use of its tracks by the complainants? A great many authorities have been cited by complainant and defendants from many states, bearing upon this question, but the first inquiry should be how have our own state courts spoken upon the point in issue? In C. & W. R. R., v. C., St. L. & P. R. R. Co., where the question was, should injunction issue against one railroad constructing a railroad crossing over the tracks of another laid in a public street, Judge Bailey, now of the supreme court, says: "It cannot be doubted that the complainant, by laying its tracks and building its railroad in Wallace street, after having obtained permission and authority so to do from the town, acquired a perpetual easement on the street * * * As we said, in C. & N. W. Ry. Co., v. Village of Jefferson, 14 Brad., this easement is a property right, and it is as much protected from unlawful invasion as any other property, nor can it be taken or damaged for public use without just compensation. It seems clear that the construction of another road across that of complainant, though built on the same grade, is a

taking of complainants' property for public use within the meaning of the constitution." (15 Brad., 592.) In People v. W. Div. Ry. Co., 118 Ills., p. 118, the court holds: "The privilege of the use of the public streets of a city or town, when granted by ordinance, is not always a mere license and revocable at the pleasure of the municipality granting it, for if the grant is for an adequate consideration, and is accepted by the grantee, then the ordinance ceases to be a mere license, and becomes a valid and binding contract." The court held an ordinance repealing the grant void.

In City of Quincy v. Bull, 106 Ills., the court says: "The ordinance of August 7th, 1873, and the acceptance by Prince, constituted a contract between him and the City of Quincy by which there was granted the right of way claimed * * * This privilege of use of the streets by Prince is not a mere license revocable at the pleasure of the city council, but it is a grant under an express contract for an adequate consideration received and binding as such."

The Supreme Court has held in the case of People vs. West Division Railway Company, 118 Ills., 118, where the city council undertook to force the company to extend its line to Lawndale, that "in the original ordinance no right to alter or change the terms upon which the railroad company accepted the ordinance was reserved, and in the absence of such reservation we are aware of no principle upon which the city without the consent of the company can impose upon it other or additional obligation." And in Parmelee vs. Chicago, 60 Ills., 267, held, that an ordinance granting a right of way in a street requiring the company to keep in repair the portion of the street occupied by its tracks, was a valid contract which could not be impaired by subsequent legislation. Citing and following Chicago vs. Sheldon, 9 Wallace, U. S. 50.

In Chicago Municipal Gas Company vs. the Town of Lake, 130 Ills., 54, an ordinance was passed authorizing the laying of gas mains, etc., in the public streets. This the town attempted to repeal. The court says of the first ordinance: "If this was a mere license then it was revocable at any time before it was acted upon (M. C. Ry. Co. vs. C. W. D. R. Co., 37 Ills. 317). The privilege of the use of the public streets of a city or a town when granted by ordinance is not always a mere license and revocable at the pleasure of the municipality granting it, for if the grant was for an adequate consideration and is accepted by the grantee, then the ordinance ceases to be a mere license and becomes a valid and binding contract, and the same result is reached where in case of a mere license if it is, prior to its revocation, acted upon in a more substantial manner so that to revoke it would be inequitable and unjust."

It has also been held in this state where a party made a deed of land to the city for a street upon condition that the street should always be maintained as of a certain specified width, that there was an implied obligation on the part of the city to maintain it as a street, and that the grantor had by reason thereof an interest in the street

which could not be taken away from him without just compensation. (See *Johnson vs. F. & M. R. Co.*, 111 Ills., 417. *Central City R. Co. vs. Ft. Clark R. Co.* 81 Ills., 424). In that case the city council passed an ordinance giving the Fort Clark Company the right to use three blocks of the Central City Railway tracks for the purpose of making connection with tracks of its own on two streets running at right angles with the Central City Railway tracks. The Fort Clark Company commenced condemnation proceedings to ascertain the just compensation to be paid for the joint use of the three blocks of track sought to be taken. The Central City Railway filed a bill to restrain the condemnation proceedings. The supreme court says: "The question then is, under the laws of this state, can a competing horse railway company in an incorporated city acquire by compulsion a title to, or the joint use of the track and superstructure of another like corporation and for the express purpose of making the part so compulsorily taken, a portion of its lines * * * Proceedings might be instituted to condemn the entire road * * but that one competitive road can bisect another road here and another road there, at a different point, thus leaving an unproductive fragment to the first proprietor, we do not believe and have seen no authority giving countenance to a doctrine in its operation so unjust and at war with just principles.

And we are at a loss to understand how this part of appellants' franchise occupying the most populous and business part of the city can be operated by their competitors."

In that case the ordinance not only authorized the use of three blocks of track but declared that the public interest forbade the laying of any more tracks in the three blocks. If the contention of the complainants in this case is capable of being sustained, the joint use of the tracks of the Central City Railway was not a taking of its franchise or of its property, but merely the exercise of a right by the city to control the use of the public street. The court in effect holds that the rights of the Central Company in the streets were a valuable franchise and property right, and that the effect of giving a joint use was practically to destroy the franchise of the Central Company obtained by legislative authority, and this the city, it held, could not do.

Mr. Dillon in his work states the law clearly and concisely: "As special legislative authority is necessary to enable a company to construct a passenger railway in the streets, the effect of such authority, when obtained and acted upon, is to give the company a property in the franchise and road, and hence, no rival company has the right to use the track of the company that laid it down." He then states, "A grant of authority to construct a street railway is not exclusive and the legislature may, without compensation, authorize a second railway in the same street," and discusses the question as to the power to give such an exclusive grant, and proceeds: "But whatever may be the extent of the legislative power in this respect, it is clear that the legislature cannot without compensation to the first company, authorize the second

company to take or use the tracks of the first, although, with compensation this might be done under the power of eminent domain, if in its judgment the public good required it."

Among other cases from other states, cited for complainants, the following are directly in point: *Jersey City & B. Co., vs. Jersey City & H. R. R.*, 20 N. J. Equity 61. This is a leading case and contains an able discussion of the authorities. It holds, among other things, that because the rails were laid in a public street, the rival company, as a part of the public, did not have a right to run cars upon such rails, and that the iron rails and superstructure were not, by laying them in the public street, abandoned or given to the public, any more than stone steps, iron railings, posts, vault covers or flagging, placed within the limits of a street are abandoned or given to the public. That while persons using the street may cross the rails, or even in using the street may drive occasionally upon or along the tracks, yet no one would be allowed to have a carriage constructed especially to pass over the track and adapted to no other part of the street, and by it appropriate the complainant's property to his own use." Citing many cases, and also the report made by Judge Redfield to the legislature of Massachusetts on the case of the *Broadway R. Co. vs. The Metropolitan R. Co.*, referred to him by the Supreme Court of Massachusetts, containing a most complete exposition of the law as to the rights of railroads in public streets. (1 Redfield R. Co., 638.)

In *Citizens' Coach Co. vs. Camden Horse R. Co.*, 33 N. J. Eq., 26, there is found a valuable decision to the same effect as that found in the 20th, N. J. Eq., and holding that a coach or omnibus company would be enjoined from using the rails of the horse railway company in competition with the horse railway company. See —36 Ohio St., 251.

That, where tracks are laid in a street for railroad purposes, "the material thereof remains private property of the company and for such purpose it is subject to the use and control of the owner exclusively." That a rival company should not appropriate such property until a compensation is first made by the latter to the former company, and, "that the municipal authorities have no more power to fix the amount of compensation to be paid for the joint use of the material, than it has to determine the compensation to be paid to other owners of private property taken for the same use."

(See also 44 La. St., 58; 67 Ills., 147; 32 Barbour, 361; 96 Ills., 274; 111 N. Y., 1; 97 Ills., 506; 49 Ia., 147; 100 Ills., 21; 75 Md., 245; 65 Tex., 502. It follows from these authorities that the City Railway Company has a property right and interest in the rails laid in the street, and in the use thereof, of which it cannot be deprived without just compensation first ascertained and paid. It is unnecessary to exactly define the extent of this property right, as, if it exists at all, it is entitled to protection as private property, which cannot be taken for public use without compensation. The property of a corporation can no more be taken and given to another

corporation for public use, than, can the property of a private individual be taken and given to a corporation for public use. Corporations stand before the law upon the same footing as natural persons, and are entitled to the same protection of their property in every respect, no less and no more. Property belonging to a corporation is as much "private property" as if the same belonged to a natural person.

It is argued that if the Court is of the opinion that defendant company is injured in its property rights the Court can ascertain the extent of the injury, and direct compensation and if necessary so to do, may impanel a jury therefor. In addition to the clause in the bill of rights heretofore quoted, Sec. 14, Art. 11, provides, that, "the property and franchises of incorporated companies may be taken for public use, the same as of individuals, and that the right of trial by jury shall be held inviolate in all claim for compensation which in the exercise of said right of eminent domain, any incorporated company shall be interested for or against the exercise of said right." "The defendant has a right to a jury trial as to the compensation it is to receive when in the exercise of the right of domain its property is sought to be taken for public use, and the bill of rights declares that such compensation shall be ascertained by a jury as provided by law."

The legislature has provided a law proceeding under the eminent domain act, passed in pursuance of the constitutional provision, and the opinion of the Court is that the defendant has a right to insist that proceedings to condemn its property for public use shall be taken under that act. (See *Cate vs. Allen* 149 U. S. 451.) There would be no more difficulty in ascertaining the value of the property right sought to be taken under the complainant's ordinance than there would be in ascertaining the damage occasioned by taking a crossing or a railroad. Not only is the remedy at law complete, but until that remedy is pursued to a verdict and payment of compensation it appears chancery could have no jurisdiction over the rights of the parties in the joint use of the tracks. The manner of the joint use and the extent of complainants' use of the tracks, as well as the compensation must be ascertained at law before a Court of chancery can interfere. It would be inequitable and unjust to permit complainant to use defendant's tracks until that just compensation is first ascertained and paid. The complainants' right to use the tracks is not complete until that is done.

The Court has attentively considered the arguments and brief of the counsel for complainant and the many cases they have cited. Many of them bear upon the question as to the general powers of the City in the control and regulation of streets, and others are to points that are not contested, as for instance, that the City cannot grant to a railroad company the exclusive use of a public street; that the public authorities have no right to sell or give away streets to railroad companies; that the City cannot divest itself of its control over public streets, that the franchises and property of a corporation

may be taken for public use, or for other or different public use, and others of like character. Some of the defendant's authorities cited, tend to sustain their contention, that a railroad occupying under a license to lay its tracks in a public street, thereby acquires no ownership or property rights in the street, and that such tracks when laid cease to be private property, that a city can authorize one railroad to use the tracks of another railroad laid in public streets, and that when compensation is to be paid it may be ascertained in the mode directed by ordinance or by court of chancery, but the cases most directly bearing upon the points directly in issue in this case, are from foreign states, and do not commend themselves to the judgment of the Court. It is unnecessary to refer to more than two or three of these cases. It is apparent that in the decision bearing upon these questions, regard must be had to the provisions of the City Charter, and the constitutional provisions guaranteeing the rights of private property.

One of the strongest cases cited by the defendant is that of *Covington Street R. R. Co. vs. Covington S. R. Co.*, 19 American Law Rpts. N. S. 765. A bill in chancery was filed in that case by one horse railroad company to restrain another horse railroad company from continuing to use tracks of Company No. 1 laid in a public street. Company No. 2 had obtained a legislative act giving it the authority to use the tracks upon "equitable terms," and had, it is to be supposed, by consent or acquiescence, entered upon and was in the use of the tracks. In that case the aid of the Court of chancery was sought, to oust Company No. 2 from possession. Here it is sought to put complainants in possession. The Chancellor refused the injunction, stating that it did not appear that Company No. 2 was insolvent, or that compensation for the joint user had ever been demanded; and held that as there was a defect in the legislative act in failing to declare the mode of ascertaining the "equitable terms" or compensation to which Company No. 1 was entitled, and as to when and how it was to be paid, the chancellor could ascertain it. There is much said in the decision that partakes of the nature of obiter dicta, and, that is opposed to the current of authorities. When it is stated that the Kentucky constitution does not require the "fair compensation" to be ascertained by a jury, and, to be paid before the taking as ours does (*Cook vs. Commissioners*, 61 Ills.), it will be seen that the Kentucky case is not entitled to very great consideration.

In the Missouri case, 15 S. W. Rpts., 1013, it appears that the state constitution submitted a charter to the voters of St. Louis, which was adopted, containing a provision that "any street railway company shall have the right to run its cars over the track of any other street railway company, in whole or in part, upon the payment of just compensation for the use thereof under such rules and regulations as may be prescribed by ordinance. The State constitution provided for the ascertainment of the just compensation for taking private property for public use, that it should be by "a jury or board of commissioners." The court held that under the charter and

constitution the City Council could give authority to a horse railroad company to use the tracks of another, and by the same ordinance appoint the board of commissioners to assess the just compensation. The charter and the constitution being different in that case from the Chicago charter and our State constitution, the decision has but slight, if any, bearing upon the case.

The defendant cites *Field vs. Baring*, which went up to the Supreme Court from this court, 149 Ills., p. 556, wherein it was held that the city could give no individual (or corporation) "any interest in a public street except so far as it is connected with a governmental purpose."

That was a case where *Field & Co.* obtained an ordinance authorizing them to throw a causeway or bridge over 40 foot street, so as to connect their two stores. A property owner complained because it deprived him of light and air. The right given was for purely a private use and purpose, and the language quoted was applicable, but here the defendant has a property right under an ordinance passed for a governmental purpose. It is a governmental or municipal purpose to give facilities for quick and convenient transportation of the citizens over the streets, and thereby relieve its congested condition as to the resident portion, as it is to provide gas or water for the use of its inhabitants. The city when it grants its streets for either of said purposes, is exercising its powers for public or governmental purposes. The governmental or legislative powers of the city are exercised as much in opening a new street as in controlling its use, but it would hardly be contended it could go into a court of chancery to assess the "just compensation," or that it take the property therefor, or authorize a corporation to take it for its own use, without compensation.

The defendant obtained permission and authority to lay its tracks down on Twenty-second street, and to run its cars over the same, under a valid ordinance for a valuable consideration. It has laid the tracks and run its cars over them for several years. It has obtained not only a binding contract with the city under the decisions of our Supreme Court, but an easement in the street, and has a property right in the rails so laid and the user thereof, of which it cannot be deprived except upon just compensation as ascertained (and paid) as provided by law. To hold otherwise would be to hold that the vast interests of horse railroads in this city, amounting to many millions of dollars, are held subject to the whim, caprice or mercy of the City Council.

To protect the rights of "private property" is the duty of all courts. In truth it may be said that the continued existence of our civilization depends upon the protection of private "property."

The bill in this case must be dismissed for want of equity, at complainants' costs.

The Beecher Single-Rail Electric Railroad Company has notified bondholders that July interest cannot be met, but that by October, interest coupons will certainly be paid.

A NEW TYPE OF CAR FOR ST. LOUIS.

The St. Louis Car Company has finished a new type of car for use on the Union Depot Railroad of St. Louis, one of which is shown herewith, mounted on the St. Louis Car Company's maximum traction truck. It is an open car closed around the bottom. The seating capacity is 38. It will be noticed that there is a middle entrance, and that the pillars are continued straight down to the sills, as in steam road car building, so that there is



NEW TYPE OF CAR.

no convex or concave panel. If desired the car could probably be closed up for winter use without much expense. The middle entrance can be put on either side as desired.

SWEET ELECTRIC MATTERS.

Our investigation of the present condition of the Sweet Electric & Manufacturing Company, of Grand Rapids, Mich., seems to present little promise to its creditors. The property was sold under mortgage and realized a trifle over \$1,300. There were labor claims of \$1,000, which were preferred claims, leaving about \$300; besides this there is little; as considerable of the several hundred dollars of outstanding accounts is worthless. The debts amount to over \$12,000, and the trustee states the concern will not pay 5 per cent. The original stockholders are said to be good, and some of the stock was transferred to Butterworth & Lowe, who are also good. Whether the creditors will decide to make an attempt to hold the stockholders has not been decided.

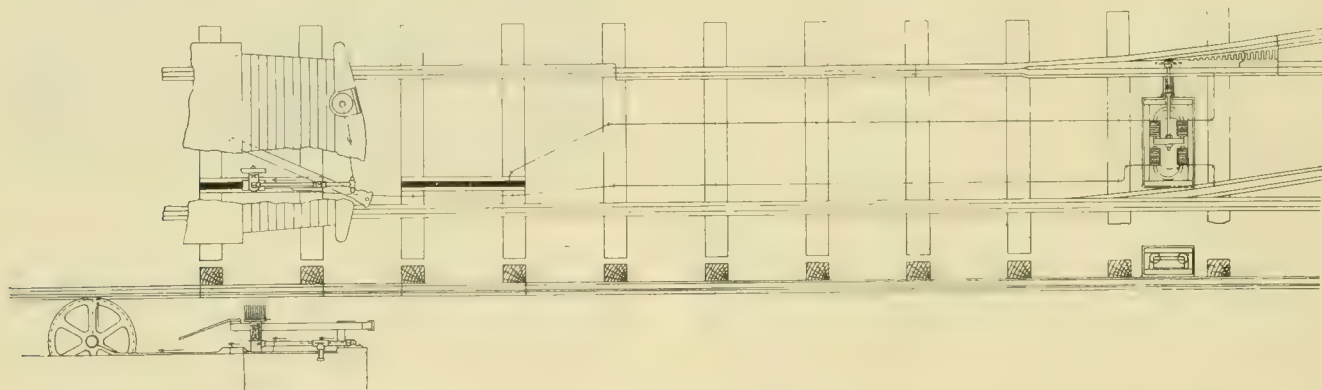
Max A. Berg, formerly connected with the Ansonia Electrical Company, Chicago, and later with the Wallace Electric Company, has opened a Chicago office for the Ohio Brass Company at 1318 Monadnock building. Mr. Berg is a young gentleman of wide acquaintance, and will no doubt be able to convince his old friends of the excellence of the line of specialties he carries, which will recommend themselves to the new acquaintances he will form.

THE WHEELER ELECTRIC TRACK SWITCH.

Many have been the attempts to devise and perfect an automatic track switch which does not require the stopping of the car or the use of a switch hook when the point is not set in the right direction. L. Wheeler, an employe of the Sioux City Traction Company, seems to have come as near a successful solution as any one. An electric device for that purpose has been in operation on the Sioux City Traction lines for fourteen months, and Superintendent Walker pronounces it beyond question a practical success. The switch throwing apparatus consists of two electro-magnets enclosed in a water-tight box, built of iron, with wooden lining to hold the magnets firm without interfering with the magnetic circuits. The lid of the box is held by stud bolts with a gasket to make it water tight. The rod connecting the armature with the switch tongue is enclosed in an iron case, which

SPEED FARCE IN BROOKLYN.

First the Brooklyn City Council passed an ordinance limiting the speed of electric cars to 6 and 8 miles an hour. This was apparently done to give 15 men jobs as speed inspectors. These men stood on street corners with watch in hand, the laughing stock of everybody, timing the cars between blocks. Then they made notes in little books. Reports were made to the city attorney that companies were violating the ordinance. He began suits in police courts. In the meantime the trolley speed inspectors were discovered to come under the civil service regulations. The first lot were fired, but didn't accept, another lot of 15 were appointed, and there were 30, who turned in reports. The cases were called, a continuance was granted. They were called again, another continuance was granted. On July 25 they came up again before Justice Neu. Assistant Corporation Counsel Wood said he had come before the court to try ques-



WHEELER ELECTRIC TRACK SWITCH.

is screw fitted into the iron box with a packing box at the end of the case. The rod is fitted with a device for lengthening and shortening if affected by the temperature, and also with rubber cushions for lessening the concussion. These magnets are connected each to a section of false rail laid some distance in front of the switch. To throw the switch, a device, as shown on the car, will when depressed connect the brush with the ground wire of the controller and disconnect the ground wire from the wheels. The current must then return through the brush, and when the brush strikes the false rail the current flows through the coils of one of the magnets on its way to earth and the switch is thrown one way or the other, depending on which rail the brush is on when the current is turned on at the controller. When the brush is up the ground wire is connected to the truck as usual. The brush is lowered by the pressure of the foot on a treadle. The false rails can be placed any distance from the switch, so that the motorman can see whether the switch was thrown or not. If the tongue is frozen fast there is no chance for breakage. If anything should happen that the electric switch thrower did not work, the tongue could be moved with the switch hook. These two latter points give it an advantage over mechanically operated switches.

tions of law, and not questions of fact, and the magistrate dismissed the cases. The curtain was rung down.

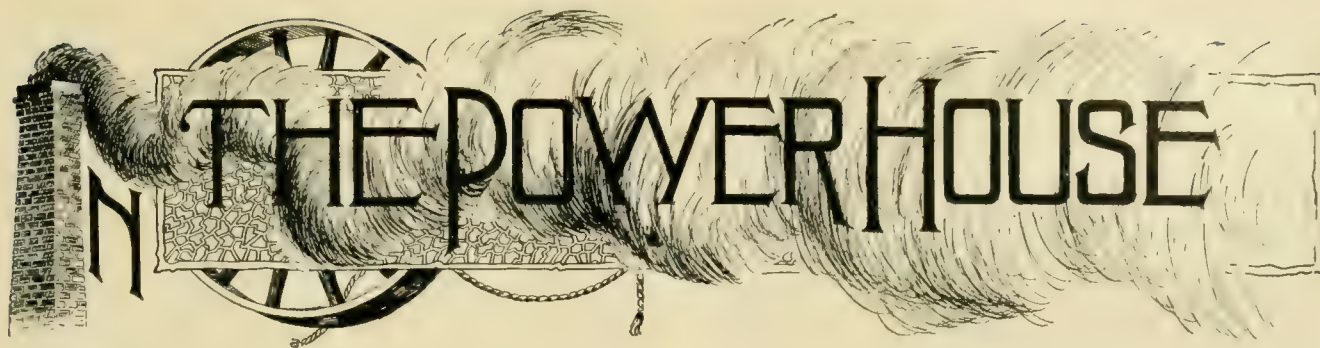
Attorney S. S. Whitehouse, who represented the Atlantic Avenue and Brooklyn Heights companies, said:

"This ordinance which restricts the speed of cars, we claim, is invalid and unreasonable. It is also a violation of the rights granted to us by the board of aldermen in 1892. The simple question of how fast the cars are run is easy to dispose of, but the question as to whether the ordinance is unreasonable requires the examination of experts.

"We intended to bring a number of prominent railroad men here from other cities to testify as experts. It would have taken three days to try one of these cases but the expert testimony could have been given in one suit and stand for the other cases as well. The companies have fixed their schedules in conformity with this ordinance, and it has provoked a storm of disapproval all over the city."

The citizens got tired of horse-car speed, having long outgrown that stage and demanded the old schedule. The companies have begun proceedings in the Supreme court to test the constitutionality of the speed ordinance.

The cases will be rushed as fast as possible, so that they will be settled before winter.



This department is devoted to the construction and operation of electric railway power houses. Correspondence from practical men is specially invited. Both the users and makers of power house appliances, are expected to give their views and experiences on subjects within the range of the department.

Power Plant Economics.

BY J. W. GREER, SECRETARY AND GENERAL MANAGER, YOAKUM, TEXAS, IMPROVEMENT COMPANY.

In discussing this subject I will not tax your patience with a homily on the relative merits of high and slow speed engines, direct coupled or belted generators, water tube or horizontal return flue tubular boilers, but will take it for granted that you have a thorough knowledge of the strong and weak points of these various appliances, which have received such thorough discussion since the advent of mechanical traction. The state of engine building and dynamo construction, has reached the stage where the standard makes will generally be found to exceed the guaranteed efficiency and rated capacity on the date of official trial at least.

The arrangement of the plant has much to do with cost of operating it, and is a matter of more vital importance in most instances than the first cost of real estate, since upon the relative positions of boilers, coal bins, engines, dynamos, switch board, condensers, pumps, heaters, etc., depends the number of men required to operate the plant.

If the arrangement is such that one additional man is required, who could otherwise be dispensed with and his services only cost one dollar and a half per day it means three dollars each twenty-four hours added to the cost of operating the power plant. Or interest at 4 per cent on more than \$27,000.

The writer has in mind a plant which was held up as a model to street railway managers, where vertical triple expansion engines coupled direct to the generators are used, and Scotch internally fired boilers with mechanical coal and ash conveyers are employed, and yet there are three men employed each watch to do work which the expenditure of a few dollars in some minor changes would render wholly superfluous. The men alluded to are oilers, and receive \$1.65 per day each, thus entailing an expense of nearly \$10 each twenty-four hours or interest at 4 per cent per annum, or more than \$85,000.

Again a plant may be constructed with due regard to all points of economy in operation, and yet from a lack of knowledge of the laws of combustion, an extravagant fuel bill may result, and engine and dynamo builders be blamed for the apparent inefficiency of the plant when really they are in no wise at fault.

To illustrate, we will say the furnaces are built to use the best lump bituminous coal. The grate area is small and the distance from the boiler to the grate bars is calculated for that fuel and so is 26 inches. Now to get the best result from bituminous coal the fire should be thick and the coal should cover every particle of the space over the face of the grate bars, thus preventing the air from entering the furnace without passing through the coal. The coal is coked, gas is formed, combustion takes place and the long intensely hot flame distributes an even and efficient heat throughout the exposed surface of the boilers.

Lignite or brown coal has very little gas, the flame is short, and it is a slow burner, consequently it has to be fired thin, requires a great deal of air and large grate area.

On account of the short flame the grate bars must be placed within 16 inches of the boiler at their rear ends.

For burning wood the grate area must be large and the furnace deep.

It will be seen at once that neither of these fuels could be burned to advantage in a furnace built for the other, and yet there are managers who if offered a new kind of fuel at a small reduction in price will load up the fuel bins and expect the engineer to produce a corresponding decrease in fuel bills without knowing or caring whether the furnaces are adapted to its use.

Should the difference in price however, be sufficient to produce a small decrease in fuel bills under the adverse circumstances mentioned, it must be clear that a few dollars expended in changing the furnace to suit the fuel would largely add to the result.

The writer was forcibly impressed with this idea by overhauling a plant where the purchasing agent had succeeded in getting the price of wood, lignite and coal, all on an equal footing when used in the same furnaces.

It being optional with the writer to use either of these fuels, one of three furnaces was selected for experiment and changed successively to suit the different fuels, with the result that in less than a month with an expenditure of \$87 the fuel bill had been reduced as 9 is to 16, or nearly one-half.

In selecting a fuel, it will be found advantageous to use—when the prices are equal in proportion to results—that with the greatest bulk. In doing this you make it to the interest of the fireman to use as little as possible, and you can wager he will see the point. The smaller the heat-giving agent the higher the price and the greater the facility with which it can be wasted. If the plant is large enough to warrant a chief engineer, he should not be expected to do manual labor, but should be led to believe that his position depended wholly on his ability to keep the operating expense at the lowest ebb, and every thing in “apple pie” order. Every plant, large or small should be provided with a steam recording gauge and a recording watt meter, also a first class indicator. With a chart, diagram, and card, from these each day and a daily report made as per the blank illustrated the manager will be able at all times to tell “where he is at.”

Operation of Power Plant. _____ Date _____

..... General Manager.

A blackboard and clock are important adjuncts to a plant. Each quart of oil drawn, and the time of every occurrence of interest to the manager should be noted on

POWER PLANT

NAME	OCCUPATION	HEAVY WORK	LIGHT WORK	RATE	SIGNATURE
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

The overhead system of every road of any magnitude should be divided into sections, and in the power plant each section should be controlled by both a circuit breaker and a fusible plug switch, which should be arranged to "go out" at a slight overload. The circuits should be so arranged that the load to be carried on any one, should not be greater than the maximum capacity of the weakest power unit in the plant, but if the units are very large then only convenience of operation need be consulted in the arrangement of circuits.

Under the head of "remarks" in the report, the engineer is expected to report the cleaning of boilers, purifiers, etc., and should call attention to anything in the line of economy he desires to try.

With a report before him of the time the plant was started in the morning, of the time it was stopped at night, of the exact operating expense for the day, of the number of cars operated, a chart from the recording gage and a diagram of the watt meter, if the general manager can't tell whether the highest efficiency is being obtained from the power plant it is time for him to retire in favor of some farmer from the forks of the creek.

A dry-goods clerk might stroll through a power house and observe that the engines and machinery are as bright as new dollars, and the floor as clean as a parlor and yet while these things are attractive to the eye and to be encouraged they have about as much bearing on the economical operation of the the plant as a fifty thousand dollar power house has on the efficiency of the plant it contains, which perhaps cost half as much.

Take a look at the interior of the boilers occasionally, and see for yourself whether your fuel is being fired against the boiler plates alone or an inch of scale in addition.

Put your thermometer in the hot well and see if "the old man" is working his condensing water as hot as possible (without destroying his vacuum) and thereby killing two birds with one stone, viz: decreasing the steam consumption of the condensing pumps, and increasing the heat of the feed water.

Count the strokes of the boiler feed pump, and see if a pump which ought to supply the boilers at forty strokes per minute has to be run at eighty strokes per minute. If so it either needs packing or a new set of valves or springs, and is wasting lots of steam which a few minutes' work or a trifling expense would save.

Count the drops of oil which pass through the lubricators each minute, and if twice the necessary number are being used "raise Cain about it."

Glance at the steam pipes and see if there is a leak sizzling out good money in the form of steam, to vanish into thin air or nothingness.

Look up at the smoke stack and see if a thin blue vapor is floating away from it, as it should, or whether "great volumes of dense black smoke" is being belched up to the detriment of the coal pile and economy.

It is not to be supposed that it is necessary for the superintendent or general manager to have been an engineer, fireman, or oiler even, in order to know whether the power plant is being efficiently and economically operated. Any man who is wide awake enough to manage the business affairs of an electric railway should be able to take in at a glance the "little things" along the lines mentioned, as well as many others which thought and observation will suggest.

Put a good man in charge of the plant and then keep your eye on the good man.

The lack of attention to "little things" has put many a road in the hands of a receiver or the sheriff. A nickel is a "little thing," but enough of them heaped together will cause the coffers of the "soulless corporation" you represent to overflow, and produce a smile on the visage of everyone connected with the outfit, except, of course, the minority stockholder.

A foul boiler may waste more fuel than a compound condensing engine can save.

A worthless fireman may send more coal up the stack in the form of black smoke than the feed water heater or live steam purifier saves. The use of a poor lubricant may cause frictional loss which will offset the superiorities of the best engine.

In buying oils a high price is no more indication of superior lubricating quality, than a low price is an indication of economy. Select oils for their lubricating qualities and see that the engineer uses just enough and no more than is necessary, and you will find that much more can be saved in this way than by haggling over a difference of a few cents per gallon in the cost.

In order to illustrate how the arrangement of a plant affects the pay roll, the ground plan of a plant which is in daily use and has been for five years is given.

At the time this plant was built there were few if any consulting engineers in the field of electric railway work. Consequently each road bought and arranged the steam plant to suit the ideas of the superintendent or general manager.

The city in which the plant illustrated is located, was admirably situated for the operation of a horse car system and equally unsuited as to location for electric traction.

Spanish mules (the best "hay motor" ever used) could be bought at \$25 each and fed for ten cents per day. After being used for years the mules could be sold as "broken stock" for much more than original cost. On the other hand, being many hundred miles from a coal field and still further from a base of electrical supplies it looked like folly to attempt the change from animal to mechanical traction. However, the president of the company, a wide awake up to date young man, with the keen perception born of business instinct, saw that the time had come when the best interest of the property would be served by adopting electricity as a motive power. The duty of selecting the location of the plant, its arrangement, and the machinery to be used, devolved upon the writer, who was enjoined by the president to "spend nothing for frills but to spare no expense where questions of economy and efficiency were involved."

The result of this admonition was the building of a plain rectangular structure 50x100 feet x 24 feet in height in the clear. The building was constructed of corrugated iron roofed with tin; cost \$2,800 and gives just as good protection to the machinery as if it cost ten times as much. The foundations of engines and dynamos cost nearly as much as the building itself. Four horizontal return tubular boilers, seventy-two inches in diameter by sixteen feet in length, with a shell three-eighths thick and containing seventy-two four inch tubes were placed in batteries of two. The thin shell and large area of these boilers gave good steaming results. Two Hoppes live steam purifiers arranged above the boilers and in such a position that both can be cleaned from the same platform, and both piped so as to feed either or all of the boilers were provided and have done their work so perfectly that no scale has ever formed in the boilers. Four Armington & Sims compound engines, rated at one hundred horse power were belted direct with Schieren perforated belts to the generators. Two Edison number 32 bipolar generators and two T-H., M. P. 80 machines are used, the rated capacity of the dynamos being greater than that of the engines. This departure from the prevailing practice of that day created considerable unfavor-

able comment at the time, although at present it would be taken as a matter of course.

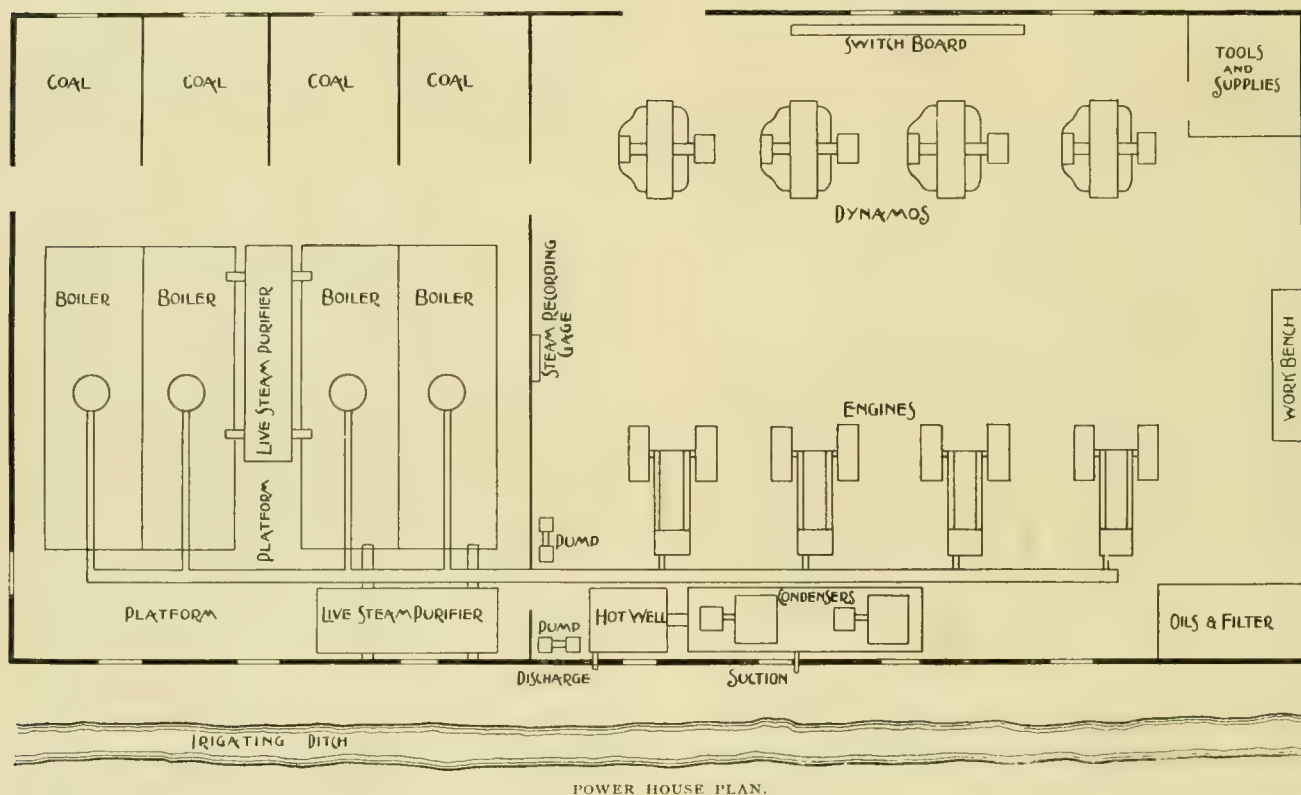
Two Blake independent jet condensers were placed in a pit directly in front of the engines. The condensing water was taken from an irrigating ditch at the side of the building and discharged into a hot well between the condenser pit and boiler room. An overflow pipe returned the surplus to the ditch. As practically no water was lost from the volume flowing in the ditch, a nominal fee of twenty-five dollars per year only was exacted for its use.

Two boiler feed pumps connected to feed both purifiers or all the boilers, were placed in the engine room in close proximity to the hot well, from which the warm

The floor of the boiler room is concrete and cement, that of the engine room is yellow pine.

The over head system is divided into eight sections, each controlled by a fusible plug switch and each dynamo is protected by a circuit breaker.

The machines are worked in multiple and each has an ammeter, and a main ammeter totalizes the output. Watt meters had not been introduced at the time this plant was constructed. It is the rule in this plant when the circuit breakers "go out" to remove all the plugs before replacing the circuit breakers. The practice at the present day of providing each section with a circuit breaker is better, although no more effectual in preserving the dynamos from injury. The multipolar machines



water could be pumped into the live steam purifiers where it is heated almost to the steaming point before entering the boilers. It will be observed that all the steam pipes are as straight as possible and both the steam and water is conveyed through the shortest and most direct route both to and from the source of supply.

The steam recording gage is placed in the engine room on the partition wall. The switch board is directly back of the dynamos and far enough away so that the instruments are not affected undesirably.

The coal is delivered directly into the bins in front of the boilers through windows which serve the additional purpose of providing light and air to the fire room.

The foundation of the engines is a solid body of masonry six feet deep, twelve feet wide and forty long, made of cut stone laid in cement. The dynamo foundations are the same, and those of the pumps and condensers constructed similarly.

are turned by the two engines nearest the boilers and as the engines are identical in every particular with those driving the bipolars, the natural conclusion would be that the M. Ps. would show greater efficiency than bipolars.

Repeated trials have demonstrated (in this plant at least) that the bipolar machines will do more than twenty per cent greater work than the M. Ps.; theory to the contrary notwithstanding.

You will observe from the diagram that the fireman has nothing to look after but the work of shoveling coal into the furnaces and wheeling out ashes.

All the machinery is in the engine room, and from a position near the condenser pit, everything is visible to the eye of the engineer; the oils and supplies are convenient and a bench with tools and vise are placed in a position where minor repairs can be done without the engineer neglecting his other duties.

Two men only are required to run the plant each watch

of 12 hours, one engineer and one fireman, and yet this plant contains more machinery than many which require double the number of men.

Suppose that the condensers and pumps were put in the fire room back of the boilers it will be seen at once that the number of men by this simple alteration would be increased fifty per cent.

Suppose that the relative positions of boilers and coal bins were changed. Another increase of one man each watch would result.

Two slight changes of arrangement, therefore, it will be seen, would double the number of men required to safely run this plant.

The number of engines used varies from one late at night to the full number at the rush hours.

This flexibility adds much to the economy of operation.

It is probable that when the demand of the rapidly growing business is such as to cause the capacity of the plant to be increased, the up-to-date gentlemen now managing the property, will install a single direct coupled unit of 500-horse-power and thus the flexibility will be maintained, while the efficiency will be slightly increased.

The injunction of the president of the company in relation to the building and machinery described above is a sample of the methods which have been pursued throughout in the management of the property and it is hardly necessary to say that road has not been nor is it likely to be in the hands of a receiver.

AS SEEN FROM ABROAD.

A recent article in these columns anent the practice on some roads here to discuss operative methods with employes, gives rise to the following comment from the London Surveyor, as illustrating the more desirable position of American street railway employes, and the relations between them and their superior officers, the item is interesting. It says:

"Organization of street railways is carried well nigh to perfection in America, and it is interesting to read some particulars recently given as to the management of the staff of the companies in various towns of the union. A capital idea, carried out at St. Louis and elsewhere, is to form the employes of all grades into a mutual improvement society, presided over by the manager or his deputy. Various topics connected with the organization and running of tramways are discussed, and in this way practical hints as to working are brought forward, while each man is familiarized with the whole system of management. Perhaps the plan might be imported over here and given a wider field, though we fancy that British municipal engineers and departmental managers would not care for their subordinates to discuss systems and criticise details of organization. In some companies it is found advisable to offer substantial annual prizes to the drivers who have the fewest accidents during the twelve months, which is rather suggestive of recklessness on the part of the majority of employes. We notice that in many cases the staff of a street railroad system is paid

on a Tuesday or Wednesday, an innovation which might result in a quieter Sabbath and less fervent worship of St. Monday."

SOUTH BEND IMPROVEMENT.

The citizens of South Bend, Ind., are delighted over the change now well under way, by which the four mile line of horse car tracks extending along the banks of the St. Joe river to Mishawaka are being converted to the trolley. The company also has caught the spirit of pleasure resort enterprise, and has purchased a most slightly tract of 30 acres on the river bank midway between the two cities. Here the natural beauties will be further augmented by bathing, boating, merry-go-rounds, restaurants, pavilions, etc., providing for the first time desirable summer resort facilities.

The construction of the line involves considerable heavy work, including piling and trestle building where the road crosses ravines, and the track is being laid with Illinois Steel Company's 60 and 70 pound T rail. Three new and elegant Pullman cars have been ordered, of 40 feet length, with cross and side seats, and a baggage compartment at one end. The Baker hot water system will provide comfort for winter riding which is also heavy. The switches and special track work are from the Paige Iron Works, Chicago. When completed the line will afford one of the most pleasing and picturesque rides in the country and promises large returns.

COLLECTION BOXES IN PITTSBURG.

The Second Avenue line, Pittsburg, has adopted tin collection boxes, 3 by 5 inches in size, carried by a strap over the conductor's shoulder, and into which the passenger drops his nickel. Conductors will carry change to supply passengers with the exact amount of fare.

WASHINGTON TO SANDY SPRINGS.

James B. Colegrove and others have incorporated the Washington, Sandy Springs & Baltimore Railroad Company to build from Takoma Park, a suburb of Washington, north 16 miles to Sandy Springs and eventually to, Ellicott City, Md. The country through which the line will pass is noted for its salubrity and picturesque scenery and is an ideal locality for suburban homes. Amid the primeval forest trees of this region the company will establish Rockdale Park and build a modern summer hotel, the Kittoctan Inn. A wonderful cave, the labyrinths of which have been only partially explored, will be only one of the numerous attractions which the new road will present to pleasure seekers.

An Irish street car conductor called out shrilly to the passengers standing in the aisle: "Will thim in front plaze to move up, so thot thim behind can take the places of thim in front, an' lave room for thim who are nather in front nor behind?"

OVERHEAD CONSTRUCTION IN THE BALTIMORE & OHIO TUNNEL.

In the change of a steam road to electric traction the most interesting part of the installation to the steam railroad man and to the electrical engineer is the overhead construction. The power house is practically the same as for any large electric railway and contains nothing that has not been thoroughly tried and tested. The track

ninety-six ton locomotives for the great tunnel of the Baltimore & Ohio railroad at Baltimore. We will not repeat the details then given of these mammoth electric machines, but will at once consider the overhead construction which has been designed to conduct successfully the enormous current taken by these locomotives. If the traffic in the tunnel could have been handled by light trains at short intervals as on all other electric surface roads, no new plan would have had to be devised

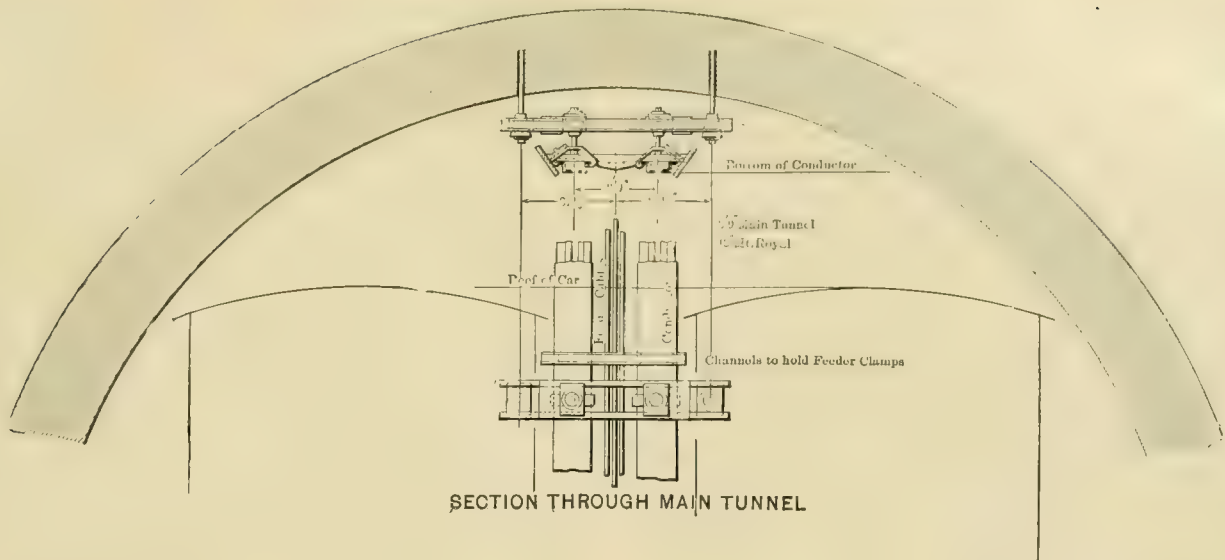


OVERHEAD CONSTRUCTION AT ENTRANCE TO TUNNEL.

and road bed needs little change for electric traction. This leaves the locomotives and over-head work as the only part of the work that is really new. Even the large electric locomotive, however, is not entirely untried, and whatever doubts steam engineers may have as to their ability to do the steam engine's work, there is no doubt in the mind of the electrical engineers acquainted with railway work.

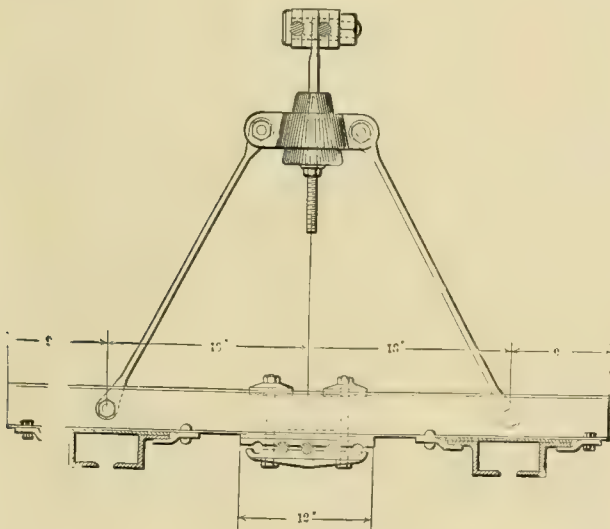
In our January, 1895, issue, we gave the details of the

for the overhead work. But in this case electric traction had to be adapted to the traffic instead of adapting the traffic to electric traction as is generally found best. The tunnel is only a link in a through line and long trains must be hauled in their entirety, hence the necessity for heavy locomotives. These locomotives take from 500 to 3,000 amperes of current when in service or about ten times as much as any electric motors now taking current from trolley wires. This is also far beyond the carrying

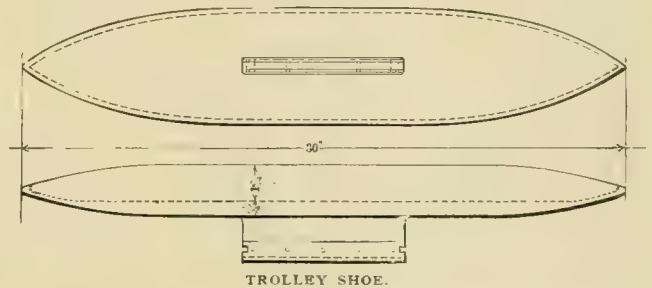


capacity of any solid wire made. The conductor selected therefore was a trough formed by two 3-inch iron Z bars in which the shuttle-like brass trolley shoe slides. These Z bars are $\frac{3}{8}$ inches thick riveted to a cover plate $\frac{1}{4}$ inch thick and $11\frac{1}{2}$ inches wide. The trough is made

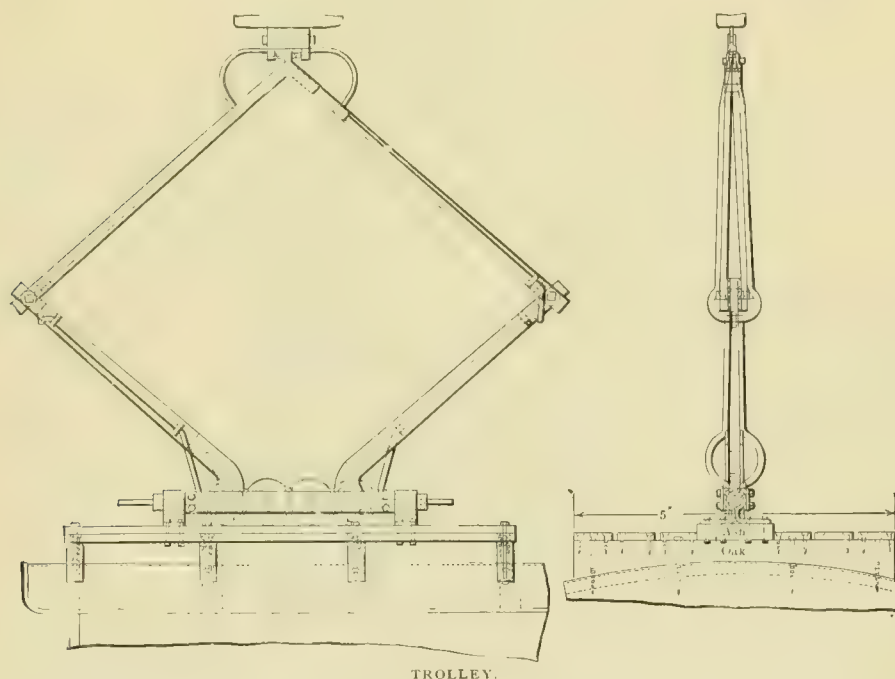
in sections 30 feet long and weighs 90 pounds per yard. The method of suspension of this trough is made plain in the engravings. Lattice steel poles on each side of the road carry between them transverse trusses. From these trusses which are 150 feet apart are stretched



SECTION THROUGH OVERHEAD WORK.



chains of iron rods. From the latter vertical rods are dropped at intervals of 15 feet to support the conducting trough. Double insulation is secured by a porcelain insulator between the vertical rod and trough hanger and by stretching the span rods from wooden posts on the trusses. In the tunnel the conductor is supported every 15 feet from transverse frames hung from the arch. Here, also, there is double insulation. The conductor is 17½ feet above the track in the tunnel, and to prevent it from being within reach of brakemen who may be on top of the cars it is put between the tracks. Out in the open the height is 22 feet. Each joint of the conductor is bonded with two number 0000 "Chicago" thimble-end bonds. These bonds are also used on the the rails. The feeders are 1,000,000 circular mil bare stranded copper.



They are supported in iron cleats which are fastened to channel frames riveted to the overhead conductors at points near the points of support of the conductors. During one of the first trial trips some little difficulty was experienced from the fact that in the tunnel the moisture had acted to form a coating of high resistance inside the trough. Consequently when a heavy current was taken the trolley shoe became red hot and almost welded itself in the trough. This trouble was overcome by cleaning out the trough and it will be kept clean by the traffic in the future.

This is the first time that the problem of conducting very heavy currents to a moving train on a surface road has been met. On an elevated road a third rail is permissible, but it is out of the question on our surface roads as they exist at present and it will continue to be so until some method of getting over the difficulty which would exist at grade crossings can be devised. It will probably be some time before an exactly similar problem has to be faced again because in cases where steam roads will adopt electricity it will be with the express

intention and for the express purpose of running light trains at short intervals. Thus nothing more than a heavy trolley will be needed.

CHARGED WITH COMPRESSED AIR.

One of the latest of the fenders invented is to be operated by compressed air. Instead of having a frame work projecting in front of the platform of the car, the new device is said to have a tank filled with compressed air or gas underneath the car, with nozzles arranged at an angle. In front and under the dash is a pivoted frame work forming a trigger. When the person or obstruction is struck by the trigger a strong blast comes from the tank and blows the offending object from the track.

If he can only get it to work the inventor has a device with many advantages. Accidents can scarcely happen to cars fitted with the compressed air fender. If a grade crossing collision is about to occur, the motorman lets go the air, and the strong blast blows the other car out of the way, or reflecting from the sides of the car causes the first car to move backwards, thus averting the accident. Suppose the power gives out as the car is crossing a steam road when a train is rapidly approaching. The nozzles are deflected towards the ground, the air turned on and away the car goes across the tracks out of danger.

Or, if the current ceases altogether while the car is on the line, deflect the nozzles, turn on the air. The car moves along as if nothing was the matter.

In that event should a person fall in front of it, the automatic trigger will do its work, the compressed air flow out lifting him gently out of harm's way, while the car's progress is unimpeded. Other makes of fenders, which pick up and carry the person, compel the stopping of the car, so he can alight. Nothing of the sort is required where the compressed air fender is in use. There is, therefore, no delay to traffic, cars are able to make schedule time, thereby being up to their full capacity of earning power. Other advantages will appear as the fenders come into use. Indeed, it may be possible by their use to do away with the expense of electrical power. Let us have more of them.

"Thank you, my dear," said the pretty young woman to the bright-eyed boy who had risen in the crowded car to give her his seat.

He stood a few moments with his feet very wide apart, and then he said:

"If I was a man and a little girl had got up to give me a seat, I'd take her on my lap."

TRAMWAY BUSINESS IN GREAT BRITAIN.

An English exchange has gathered the following data on operation in Great Britain: According to the Roman poet, "the drop hollows the stone, not by force but by frequent falling," and a graphic illustration of this truth is afforded by the working of our tramway systems. The individual contributions of the passengers are so trifling, that it is difficult at first sight to believe that it can possibly pay to carry so far for a penny the laundress with her big bundle, the matron with her three or four infants, and her half dozen brown paper parcels, or the gentleman of abnormal dimensions who bulges over two-thirds of the car. But trumpery as is the contribution of each unit, the aggregate of the coppers is enormous, piling up in the same amazing way as the collection of an additional penny on the Income-tax; and the business of carrying the laundress, the matron and the stout gentleman is so widely extended that it proves a very remunerative form of industry. The tramway and the omnibus have been rendered necessities of existence by the growth of our great towns, and are sure of public patronage, be the weather wet or dry. However bad trade may be, the receipts of the 'penny stage' do not fall off, for the greater the depression the more are people inclined to abandon more expensive forms of traveling in favor of the humbler conveyance. The tramway companies, in short, are peculiarly fortunate as compared with most commercial enterprises, in being able to count with certainty on a continuance and growth of public support year after year; and their shares deserve, we think, more attention as investments than they at present receive.

In order to obtain a fair view of the tramway position we select seven of the leading companies—the London, the London Street, the North Metropolitan, the South London, the Liverpool, the Belfast and the Dublin. It is no longer possible to deal with the Glasgow Company, as the lines have been taken over by the corporation; and the Edinburgh Company must also be left out of the reckoning, as it has now been divided, part of the lines being released and only a small portion being still worked by the original concern. The group we have taken is, however, representative of both England and Ireland. On analyzing the figures of the various reports we find that these seven companies have a capitalization of no less than £4,500,000, which represents a sufficiently heavy stake to British investors. With this money nearly 350 miles of single line have been constructed, traversing 200 miles of streets. The North Metropolitan is the largest concern, with 90 miles of single line; then come the Liverpool, with 71; the Dublin, with 58; the London, with 45; the Belfast, with 32; the London Street, with 26, and last, the South London, with 22. The heaviest capitalization is that of the London, which stands at £19,043 per mile of single line, while the lightest is the Liverpool, which stands at only £6,306 per mile, so that a vast deal of money has been expended all round on the faith of the pennies to come. As many as 1,800 cars (including 250

buses) are run by the seven companies, and 14,350 horses are worked. During the second half of 1894, no less than sixteen million miles were covered by those horses and cars, and 150½ million passengers were carried—a colossal amount of work to do in a year, yet a profitable labor after all, notwithstanding the smallness of the fares, and the heavy costs of the working. The aggregate traffic receipts came to as much as £773,000 (all in pennies and twopences!), and with miscellaneous receipts of £20,000, the companies had nearly £800,000 in return for their toil and expenditure.

As showing how fine the tramway companies have to cut their profits per individual we may select two instances. Of the seven companies, the Liverpool obtained last year the highest average payment per passenger, and the amount was only 1.86d. per traveler, while of this sum (a shade over 1¾d) expenditure ate up 82.64 per cent. The lowest average payment per passenger was obtained by the London, which drew 0.97d. per traveler, or rather less than a penny, and out of this, expenses demanded 78.46 per cent. Yet working in margins so narrow as these, the companies have been able to maintain very satisfactory dividends, as we show below, tabulating the rates of distribution for the past six half-years.

	1892		1893		1894	
	1st.	2d.	1st.	2d.	1st.	2d.
Belfast.....	7½	7½	7½	6½	6½	6½
Dublin.....	4	5	4½	5	5	5
Liverpool.....	5	5	5	5	5	5
London.....	2¾	9½	7	10	6½	12
London Street.....	4	5	4	5	4	4
North Metropolitan.....	8	7½	8	8	8	8
South London.....	Nil	Nil	Nil	2	Nil	3

TWO VIEWS OF PERSONAL INJURIES.

"Brooklynite" in the Brooklyn Eagle, has something trite on personal injury accidents :

"Last week there were two people run over by horse cars in New York city. Now, suppose this had been in Brooklyn. A certain New York paper would immediately have published in large letters : 'Trolley victims to date, 113—cause, criminal negligence of ring founded corporations supported by municipal incompetency, if not collusion. Indict the rascals and send them up.' But because the accident happened in New York, the reports of them were put in a lower corner of the paper where no one would notice them. The Brooklyn trolleys have been in operation since 1892. Since 1892, 113 people have been killed. Since 1892 about 200 people have been killed in New York. Why don't the New York papers take care of their own city and say: 'Horse car victims to date, (since 1892), 201. Cause, ring founded corporations refuse to supply the horse hoofs with mattresses, so that they won't hurt the people who are kicked under the cars.' However it be, it seems to me that once upon a time I heard a certain proverb 'People that live in glass houses shouldn't throw stones.'"

VESTIBULE EQUIPMENT.

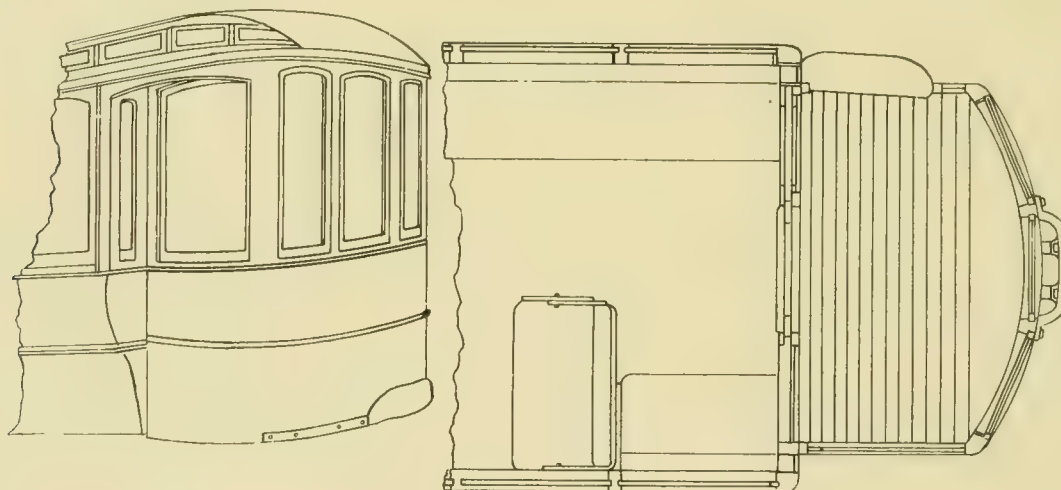
PART III.

This article on vestibule equipment is devoted to the experience of Canadian lines. The illustration is a view and plan of the vestibule of the Wason Manufacturing Company, Springfield, Mass. The opening on the side is closed by an adjustable half-door, the upper half of the opening being closed in stormy weather with a curtain. One half-door is furnished with each car, the fastenings being so arranged that it is easily detached and attached to hinges on either end of the car. On being closed the door locks itself into place.

VESTIBULES IN CANADA.

Charles E. A. Carr, manager of the London, Ont., Street Railway Company, writes: "One of the conditions of permission granted by the city council for us to electrify is that we shall have vestibules upon all motor cars. In Canadian cities, public sentiment is greatly in

favor of vestibules, and it would be poor policy on the part of any street railway company, not to adopt the same. Before the adoption of vestibules, it was thought they would only increase the liability of accidents, but practical use has entirely overcome any such impression. With the exception of one or two days throughout the winter season, the vestibule is certainly a great protection, and when a snow or sleet storm occurs, filling up the glass in front of the motor man, he can let down a little slide door, similar to those used on an engineer's cab on a steam road. However, this is merely my own opinion of the matter, and numbers of railway men look upon it in an entirely different light."



WASON VESTIBULE.

J. E. Hutcheson, superintendent of the Ottawa Electric Railway Company says: "All our closed cars are vestibuled and we find it is a great advantage. Our winters here are very cold and from December to March the thermometer rarely goes above freezing, and very often down to 20 below zero. I think you will agree with me that it would be an act of cruelty to compel a

motorman to face such weather as this for ten hours every day. In addition to furnishing vestibules for our men, they are provided with overcoats; the conductors' are made short, of heavy blue cloth, the motormen's of heavy grey cloth reaching below the knees, for which the company pays half the cost. We find the men, being comfortable, are more contented, and, consequently, give better attention to their work. In the summer we run nearly all open motor cars, but a vestibuled car, with the windows down and doors off is, practically, an open platform car. By putting double glass with quarter inch air space in two or three frames where needed in the vestibule there is no trouble from frost. I can understand that it would be a very heavy expense for large roads to vestibule all their cars, but in cold cities it will be found that the conductors will get more fares, and the men will be better satisfied with their position. We have never had an accident of any consequence during the winter months, although we run 35 vestibuled cars."

Granville C. Cunningham, manager and chief engineer of the Montreal Street Railway Company, says: "We use vestibules on our cars in winter only. This vestibule is simply a shield placed upon the top of the dashboard, fitting between it and the nose piece of the roof. It is quite open on each side. In our severe winter weather I think it is absolutely necessary to have some such protection as this for the faces of the motormen when running in very cold weather. I think the cars are better without them in summer, as the vestibule obstructs the view of the motorman more or less."

P. N. Smith, secretary of the Westminster & Vancouver Tramway Company, New Westminster, B. C., writes: "Our cars running between this city and Vancouver

are all equipped with vestibules. The cars in the cities were originally purchased without vestibules, but we found exposure to the weather caused a great deal of sickness among our motormen and conductors, necessitating frequent changes and putting on of new men. We have, therefore, put vestibules on all our cars and have found them of advantage to the company in keeping our men at their posts, thereby avoiding the annoyance of too frequent changes, and expense of training raw hands. The only disadvantage, in my opinion, comes in stormy weather, when the windows are covered with snow, sleet or rain, making it a difficult matter for the motorman to have a clear outlook."

WANTED—A USE FOR OLD CABLES.

Some new method of disposing of old cable ropes is badly wanted by managers of cable lines. At present the scrap heap is the most common place for cables that are worn out. One company removes its rope before its term of usefulness has expired and sells it to a line that has a lighter traffic. The originator of this plan has great confidence in the widespread circulation of the REVIEW, so he requested that his name be withheld from publication and that of his customers. Even in the west where the cable road had its beginning, the managers are still endeavoring to get beyond the scrap heap. There are roads that require the manufacturers to take old ropes off their hands, so they have nothing to do with the solution of the problem.

Fred W. Wood, general manager of the Los Angeles Railway Company, Los Angeles, Cal., writes that he disposes of some ropes for guy ropes and like purposes; others for use in concrete work; and occasionally a round lot to a junk man, but the bulk of worn-out cables finds no market.

G. E. Randolph, of the Denver City Cable Railway Company, Denver, writes that the company sells old cables to a company that has worked out a plan for using them on rope tramways for mines.

C. C. Sailer, general superintendent of the Washington & Georgetown Railroad Company, Washington, D. C., cuts cables in about 30 feet lengths, selling them to junk dealers who ship them out of the city.

John B. Parsons, vice-president and general manager of the West Chicago Street Railroad Company, Chicago, finds it a better plan to cut the cables into 8 or 10 feet lengths and sell them to junk dealers than to attempt to ship them direct to the mills.

J. H. Robertson, superintendent of the Third Avenue Railroad Company, New York, uses a pulling machine placed in a large gangway back of the power house, which hauls the cables from the drums. The rope passes through shears that cut it into 15 feet lengths. It is piled up and sold to dealers in old scrap who do their hauling and loading.

Robert McCulloch, vice-president and general manager of the National Railway lines in St. Louis, has never found a practical use for a rope that was no longer reliable

for service in the conduit. When a rope falls to the company, having exceeded the guaranteed mileage, it is sold to dealers in old material, who cut it into convenient lengths and sell it to rolling mills.

Frank R. Henry, secretary and treasurer of the Missouri Railroad Company, St. Louis, writes that all old cables are sold to manufacturers generally under a contract price stipulated at the time of making a contract for a new cable rope.

We have received letters from several managers, all of whom dispose of old ropes to junk dealers. Some cut them into 12 feet lengths, while others do not specify whether they cut them or sell them as they are taken out. What the junk dealers do with them is not known, as the managers are not interested in following them.

RUNNING CARS DURING STRIKES.

Judge Cole, Washington, D. C., decided that there is no law whereby a court can compel any person, natural or artificial, man or corporation, to resume business when he does not wish to do so. The decision was delivered in an action for mandamus to compel the Anacostia & Potomac Railroad Company to run cars over its line, which was tied up by a strike, or to surrender its charter. The attorney for petitioner argued that the failure to use the road operated as a waiver of the rights granted in the franchise.

Judge Cole held that the bill showed nothing which gave the court jurisdiction to issue a rule or take any step toward the issue of a mandamus. There was no law by which the court could compel any person, natural or artificial, man or corporation, to resume business when he did not wish so to do. If the company used part of its legal tracks, but failed to use other parts which it was under equal obligation to operate; if it operated the profitable portion of its road, but neglected that portion which gave no profit, the court could compel the company to do its entire work under its charter, but where a company ceased business he knew of no power in the courts to compel resumption of operations.

DID NOT OBEY ORDERS.

Disobedience of orders caused a number of persons to be injured on an Ohio line last month. The cars were crowded with passengers returning from a picnic. They were running closely under orders not to stop until they reached the city limits. The wife of an official of the company induced a conductor to stop in front of her residence in the suburbs. A car was following close behind. There was a collision in which many persons were injured. This incident suggests its own lesson.

Officers of the reorganized Alton Railway & Illuminating Company, Alton, Ill., are J. F. Porter, president and treasurer; James Duncan, vice-president; H. S. Baker, Jr., secretary; directors, J. F. Porter, C. W. Milnor, H. S. Baker, Jr., James Duncan, C. A. Caldwell.

Sargent, "It has proved very successful, but it has been in operation so short a time that I cannot say that it is perfect. The people take to it kindly, and large numbers are riding on it."

MASTER CAR BUILDERS' BRAKE SHOE TESTS.

The Master Car Builders, at their June convention, had some committee reports on brake shoes, which, although made on steam roads and for the benefit of steam road men, are nevertheless of value to street railway men. As the report of the convention has not appeared in any paper which has an extensive circulation among our readers, the result of these brake shoe tests are given here.

In 1893 the association appointed two committees, one to make a road or service test of brake shoes and the other to make a laboratory test. These committees agreed on certain kinds and makes of brake shoes which both committees were to test.

The service tests were carried on by seven roads. Each car under test had one truck equipped with soft cast iron brake shoes made by the Pennsylvania Railroad, and the other truck fitted with some one of the thirteen brake shoes under test. The comparisons are all made, therefore, with the common soft cast iron shoe which is in such general use. The cost of each shoe and the metal worn therefrom, as shown in the tables, was obtained by getting the market prices furnished by each maker and the price allowed for the shoe as scrap. The accompanying tables give summaries of the results obtained.

The laboratory tests were mainly intended to determine the coefficient of friction between the various shoes and cast iron and steel tired wheels. There was a very great difference shown in the braking power of the shoes tested with a given pressure on the shoes. Soft cast iron made the best showing on chilled wheels, and soft open hearth steel the best on steel tired wheels. However, the coefficient of friction is not a point to which much weight should be attached, because, as J. N. Barr

Table Showing Wear and Cost of Worn Metal of Fourteen Different Kinds of Brakeshoes as Compared with the Wear and Cost of Soft Cast Iron Brakeshoes

Kind of shoe.	Made by	STEEL-TIRED WHEELS				CAST IRON WHEELS.			
		Wear by wt. rel. to soft cast iron for same service.	Net cost per lb. metal worn, cts.	Rel. cost for same service, cts.	Cost rel. to soft cast iron for same service.	Wear by wt. rel. to soft cast iron for same service.	Net cost per lb. metal worn, cts.	Rel. cost for same service, cts.	Cost rel. to soft cast iron for same service.
Soft cast iron.....	Penn. R. R. Co.....	1.00	2.08	2.08	1.00	1.00	2.08	2.08	1.00
Hard cast iron.....	Ramapo W. & F. Co.....	1.06	2.81	2.98	1.43	.86	2.81	2.41	1.16
Soft O. H. steel.....	Solid Steel Co.....	.42	7.65	3.21	1.54	.17	7.65	1.30	.62
Hard O. H. steel.....	Solid Steel Co.....	.31	7.65	2.37	1.14	.10	7.65	.76	.36
Malleable iron.....	Dayton Mal. Iron Co.....	.51	2.37	1.21	.58	.53	2.37	1.25	.60
Spec. S. T. malleable iron.....	Dayton Mal. Iron Co.....	.67	2.37	1.59	.76	.83	2.37	1.97	.94
Spec. C. W. malleable iron.....	Dayton Mal. Iron Co.....	.81	2.37	1.92	.92	.83	2.37	1.97	.94
Congdon.....	The Sargent Co.....	.30	3.06	.92	.44	.31	3.06	.95	.45
Meehan.....	The Sargent Co.....	.21	6.70	1.41	.68	.31	6.70	2.08	1.00
Lappin.....	Lappin B. S. Co.....	.35	5.41	1.90	.91	.55	5.41	2.98	1.43
Safety.....	Safety B. S. Co.....	.77	3.65	2.81	1.35	.70	3.65	2.56	1.23
Soft steel (pressed).....	Schoen Mfg. Co.....	.29	5.63	1.63	.78	.11	5.63	.62	.30
Wrought iron (pressed).....	Schoen Mfg. Co.....	.29	5.78	1.68	.81	.11	5.78	.64	.31
Sargent Special.....	The Sargent Co.....	.33	4.80	1.58	.76	.22	4.80	1.06	.51

Weights and Values of Brake Shoes.

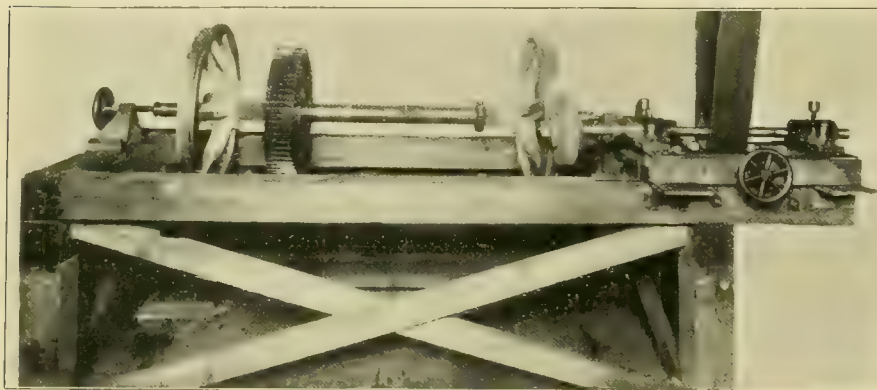
Kind of Shoe.	Made by	WEIGHT OF ONE SHOE.		Wear-ing Weight.	NET COST OF METAL WORN	
		New.	Scrap.		Per Shoe.	Per Lb.
		Lb.	Lb.	Lb.	Cents.	Cents.
A. Soft cast iron.....	Pennsylvania R. R. Co.....	22.0	10.0	12.0	25.0	2.08
B. Hard cast iron.....	Ramapo Wheel & Foundry Co.....	22.5	10.0	12.5	35.2	2.81
C. Soft O. H. steel.....	The Solid Steel Co.....	23.0	10.0	13.0	99.5	7.65
D. Hard O. H. steel.....	The Solid Steel Co.....	23.0	10.0	13.0	99.5	7.65
E. Malleable iron.....	Dayton Mal. Iron Co.....	22.6	10.0	12.6	29.8	2.37
F. Special S. T. mal. iron.....	Dayton Mal. Iron Co.....	22.6	10.0	12.6	29.8	2.37
G. Special C. W. mal. iron.....	Dayton Mal. Iron Co.....	22.6	10.0	12.6	29.8	2.37
H. Congdon.....	The Sargent Co.....	22.2	10.0	12.2	37.4	3.06
I. Meehan.....	The Sargent Co.....	22.2	10.0	12.2	81.8	6.70
J. Lappin.....	The Lappin Brake Shoe Co.....	23.3	10.0	13.3	72.0	5.41
K. Safety.....	The Safety Brake Shoe Co.....	19.1	10.0	9.1	33.2	3.65
L. Soft steel (pressed).....	Schoen Mfg Co.....	20.0	10.0	10.0	56.3	5.63
M. Wrought iron (pressed).....	Schoen Mfg Co.....	19.5	10.0	9.5	55.0	5.78
N. Sargent special.....	The Sargent Co.....	22.8	10.0	12.8	61.4	4.80

of the C., M. & St. P. Ry., pointed out in the discussion which followed the report, railways (and he might have truthfully added street railways) are to-day suffering great loss from sliding wheels. This is evidence in itself that we do not need to hunt for a shoe that will increase the bite of the shoe on the wheel. It is easy enough to lock wheels now.

A HOME-MADE WHEEL GRINDER.

BY E. KESSLER, SUPERINTENDENT RICHMOND, IND.,
CITY RAILWAY.

The wheel question is the principal one that is racking the brains of nearly all successful street railway managers. We all know this by actual experience and by what information we get from the electrical papers. After much thought and experiment on the subject we came to the conclusion that perhaps we could devise something to grind off flat wheels. We knew it to be no small undertaking, but we are happy to say we have fully overcome all obstacles. The accompanying engraving will give some idea of what we constructed to grind or reface our wheels. In the first place we made a bed plate of



HOME-MADE WHEEL GRINDER.

8 by 8 inch timbers, 10 feet in length. We then placed steel centers on the bed plate so as to swing the wheels clear. On an oak carriage made of 4 by 4 timbers we placed the emery mandrel in babbitted boxes. This carriage runs in guides and has a screw feed of 6 inches. The emery wheel is $2\frac{1}{4}$ by 14 inches, and is run to a speed of 1,550 revolutions. It is driven from a line shaft the line shaft being run by a 15-horse-power S. R. G. motor. Any street railway manager wishing more information about this machine has only to write to us. A large part of the credit is due my assistant, Cary Snyder, formerly with the Citizen's Street Railroad of Indianapolis.

Several roads which depend upon water power to drive their generators, have suffered considerably on account of unusually low water. In some localities where there was no auxiliary steam plant, there were temporary shut downs.

COMPANIES WIN FENDER CASES.

Philadelphia companies have been defending themselves for not complying with an ordinance requiring fenders to be placed on all cars. More fuss has been made in the City of Brotherly Love on the fender question than in any other city. Although the companies did the best they could to equip the cars, many suits were brought by the city against each company for violations of the ordinance. Magistrate Jermon, before whom the cases were tried, found against the city and in favor of the companies, because the language of the ordinance was faulty, ambiguous and absurd. The magistrate said:

"These suits before me are not brought to recover a debt, but to enforce a penalty for an alleged violation of the law. The cases are essentially cases of a criminal nature, and not of a civil kind; hence, it is my duty to carefully consider the ordinance under which they are instituted, and to deal with it as though it were a criminal statute. There must, under well-established principles, be a strict construction. No matter what the necessity may be for protection to life and limb against accidents in the running of trolley cars, no matter how great the demand for improved guards or fenders, nor how much

it might be my desire personally to compel the adoption of safeguards which would aid in the preserving of life and limb, as a Magistrate, I cannot consider these things; but must lay them aside, and deal solely with the legal proposition: Does the ordinance in question describe some act or neglect, denounce it as an offense, and punish it with the penalty of a fine; and does the evidence submitted to me show that the defendants have committed the offense in question? If both parts of this question shall be answered affirmatively, then my judgment must be against the defendants;

but if either is answered in the negative, then my judgment must be for the defendants.

THE ORDINANCE AMBIGUOUS.

"The language of the ordinance is ambiguous. So defective is it that one might be justified in believing that it was not only an error, but perhaps intended to be defective, and passed to defeat the very object which it contemplated securing.

'Within ninety days after the passage of this ordinance it shall be unlawful for any passenger railway company propelling its cars by electricity to run the same through the streets and avenues of the city unless each car is provided with a safety guard or fender, constructed in such a way as to protect life and limb of any person who may come in contact with said car.'

"Clearly this legislation only covers a period of ninety days, and has no operation beyond that time. Doubtless the thought was to give a period of ninety days

to the railroad corporations for preparation, after which if they ran their cars without guards or fenders they would incur the penalty. But the law does not say this, and I know of no power by which I, as a magistrate, am permitted to reform an ordinance and attempt to write into it what I may believe may have been the intent of the law-making body, when the language expressly contradicts such an intent.

"Without doing violence to the plain language of the ordinance, I cannot construe it to mean anything else than a prohibition of certain things for a period of ninety days. If the ordinance so construed be ridiculous, it is the fault of those who framed it. While pointing out this defect in the language of the ordinance, which in my judgment is a fatal one, I am not obliged to decide these cases on this ground, but have considered other branches which lead to the same result. The requirement of the ordinance is that a safety guard or fender shall be provided for every car.

CAN JUST TAKE THEIR CHOICE.

"The ordinance does not attempt to describe or require any particular kind, nor regulate where it shall be placed, so that the railroad companies are left to select between them a guard or fender, and to locate the same wherever it may seem best, in their judgment, to place it. The proofs before me established that either a guard or fender was placed in front of every car or in front of the first set of wheels. Of course, in any case where this is not so, the company is liable to the fine. The only provision that may be regarded as a regulation is the following: 'Constructed in such a way as to protect life and limb of any person who may come in contact with said car.' This requirement is so general and indefinite that it ought scarcely to be made the basis of a quasi criminal proceeding. But giving this language its full force and considering the evidence, the mind is forced to the result that there has been a reasonable compliance on the part of these defendants with the ordinance above mentioned.

"The expert witness for the city admitted on cross-examination that he could not name any device that would certainly protect life or limb under such circumstances. Hence, the compliance with this clause must ever be a matter of good judgment. In suits such as these before me, the basis of which is neglect, and the judgment in which is intended to punish a neglect, it must appear that there has been clearly established a neglect to comply with the provisions of the ordinance. Therefore, if one charged with the duty of providing these appliances, in good faith and in the exercise of his best judgment, places guards or fenders designed to protect life or limb upon his cars, then in the absence of any well-known and certain device he cannot be said to have neglected to comply with the requirements of the ordinance.

ANY FENDER MEETS THE BILL.

"In these cases, from actual experience, persons testified that the devices in use not only were intended to

protect life and limb, but had actually realized that result in the instances named. How then can it be said, in a legal sense, that these defendants have neglected to comply with this ordinance? The great difficulty arises from the fact that there does not appear to be any well defined consensus of opinion in favor of any particular device to be used as a guard or fender. In the present uncertainty and in the absence of specific requirements in the ordinance, I am of opinion that the defendants have reasonably endeavored to comply with the terms of the ordinance. I am unable to say that they have neglected or refused to comply therewith.

"It is within the province of Councils to define not only the kind of device to be used, whether guard or fender, or both, but to designate where it shall be placed on the car. It is only reasonable that they should do so, before the city proceeds by suit to collect penalties for violation of the ordinance on the ground that in the judgment of some of the officials the kinds adopted do not sufficiently protect life and limb. A quasi criminal suit for penalties cannot rest on such a basis. My judgment in these cases is in favor of the defendants, for the reasons named above."

PHILADELPHIA TRACTION REPORT.

According to the annual report of the Philadelphia Traction Company, last year was a profitable one, although the company was incommoded by the changes going on incidental to the introduction of the trolley system. The receipts from passengers amounted to \$5,459,867, against \$5,002,111 for the preceding year, an increase of \$457,756. There was received from other sources, \$202,184, an increase of \$20,638, making the total net revenue \$5,662,051, or \$478,394 more than in 1894. Operating expenses increased \$125,323, the totals being \$3,540,839 for last year, and \$3,415,516 in 1894. Total disbursements, however, were \$3,576,522, deducting which from total net receipts leaves net earnings of \$2,085,529, an increase over the preceding year of \$317,388. The report does not show interest charges or rentals, nor does it give either the income the company received from the securities it holds in its treasury. After paying dividends aggregating \$1,000,000, there was a small surplus remaining to be credited to the profit and loss account. The company carried \$111,475,982 passengers, and 39,721,208 transfers were issued. Among the disbursements were \$398,694 for the payment of taxes, and \$319,262 for damages. The balance sheet shows, among other things, these assets: Cash, \$415,713.86; stocks, \$3,731,940.22; equipment, \$2,207,283.47; construction, \$10,295,574.59, and open accounts, \$5,733,761.35. The liabilities aggregated \$22,406,278.49. The number of miles operated during the year were 203.

Amelia Sternecker, 17 years old, who has had a passion for machinery since her early childhood, has invented a fender. Of course it is built on æsthetic lines.



During the year of the Philadelphia Traction Company just ended, 3 passengers were killed, 130 injured; 4 employes were killed, 8 injured; while 22 other persons were killed and 112 injured. The company carried 111,475,982 passengers. These figures show that the majority of persons killed and injured had no business to have been where they were at the time of the accident. They were not on the cars as passengers, nor were they employed by the company. The proportion of those killed and injured where there was the least suspicion of fault on the part of the company was very small and was due solely to their own carelessness. It is the same with all roads. These figures and facts call the attention to the necessity of some means for preventing the class of accidents that it seems could easily be avoided. At the same time they prove that it is safer to ride on electric cars than it is to be outside of these vehicles.

One firm of attorneys in Newark, N. J., is said to be prosecuting personal injury cases amounting to \$100,000 against the Consolidated Traction Company. While it is not likely that judgments will be secured in all of the cases, or even for the full amount in any of them, the circumstance illustrates the extent of a new line of business existing solely to bleed street railways and steam roads. A few years ago adjusters seldom met with the interference of attorneys in the settlement of personal injury cases. Now, whenever an accident occurs, cheap lawyers, lawyers clerks, practitioners in police courts and justice shops, law students, alleged detectives and shysters of every sort swoop down like vultures on the injured person, and often almost come to blows, if they happen to meet on his doorstep, as they frequently do. They urge the unfortunate to begin suit, holding out to him promises of large gains, if he will let them begin action for damages on his behalf, agreeing to pay all expenses for a conditional fee. The courts in some cities are recognizing the evil that these fellows are doing to the legal profession, and have been handing down decisions, which makes it impossible for them to recover, when the railway company settles with the injured party out of court without the knowledge and assistance of the bird of prey.

Conductors preliminary reports of accidents are frequently of little value to the claim department, unless

The Columbus Street Railway Co.

COLUMBUS, O., _____ 189__

Superintendent of Transportation :

An accident occurred in connection with my car this day, circumstances of which are as follows :

Name of Conductor _____

Name and Number of Motorman _____

No. of Car _____ Direction going _____

Time of Accident _____ A. M. _____ P. M.

Where Accident occurred _____

Name of Person Injured _____

Residence _____

Employe or Passenger _____

Kind of Injury _____

Kind of Vehicle Damaged _____

Owner's Name _____

Residence _____

Extent of Damage _____

Damage to Car _____

WITNESSES.

Name _____ Residence _____

" _____ " _____

" _____ " _____

" _____ " _____

" _____ " _____

" _____ " _____

" _____ " _____

" _____ " _____

" _____ " _____

_____ Conductor. _____ Line.

When an accident occurs, make a report at once, giving name and residence of each witness, and write full particulars of accident on back of this report

Conductors neglecting to procure Names of Witnesses will be Suspended until such Names are furnished.

special effort is made to impress the conductors with the importance of having them accurate, complete and legible.

Willis F. Kelly, general superintendent of the Columbus Street Railway Company, Columbus, O., has for six months been trying a plan for improving the character of reports, which has been so successful that he will continue it six months longer. Reports are required from the conductor of every accident happening in connection with his car, no matter how trivial, and whether persons or property are injured or not. As a stimulus to the men to use care in making full reports and securing as full a number of witnesses as possible, the company offered prizes of \$25, \$15 and \$10 for the three best reports received within six months. The result has been so pleasing that the offer has been renewed for six months.

Accuracy and promptness with which reports are made out, together with the correct names and addresses of witnesses, is the standard of competition. This enables the adjuster to follow up the report at once, and secure all available testimony. Good spelling or penmanship is not insisted upon, but this, of course, is of some value if the other features of the report are good.

Each conductor is furnished with a small blank on which he makes out a pencil report at the time of the accident. This blank, which is $9\frac{1}{4}$ inches long and 5 inches wide, is reproduced full size. Space is reserved on the back for a statement in full of all the circumstances of the accident witnessed by the conductor, or learned at the time of the accident. The statement is signed. This blank is returned to the office and a type written copy in triplicate is made on a blank legal cap size, which is practically the same as the smaller blank. One of these is kept on file with the original, another is sent to the claim department, and still another is kept for use as testimony whenever it may be called for.

The following are instructions to conductors regarding accidents:

In case of accident, however slight, in connection with, or near your car, to persons or property, you will at once render all necessary assistance, and at once obtain the names and residences in full of the persons injured, and of all witnesses on or near the car (if the conductor omits this important duty, he will be suspended until he finds them); then make a written report on this form, filling up all blanks. This report is to be signed by the motorman or driver as well as by conductor and delivered to the office of the company.

Give no account of an accident to any person other than the general manager of the company, or the person designated by him, and then only in writing on the proper blank.

A newspaper dispatch from Mexico City, Mexico, says, a private dispatch from London announces that Senor Iturbide has closed a deal for the sale of the District Street Railway system to an Anglo-American syndicate for \$9,000,000 in Mexican silver. The system has practically a monopoly of the street railway traffic of the federal district. If the report is correct, electric traction may be adopted.

NEW SCHEME TO SECURE FREE RIDES.

A certain street railway company has awakened to a new scheme to beat it out of the fares between the city and its park. Outside of the city the stops for the cars are not at regular intervals as in the city, but along the road a sign to stop will be regarded and passengers taken aboard. A car was traveling along at a rapid rate when two young men signaled the car to stop, and they climbed on board. The fellows were decently clad, and were gentlemanly in their conduct, but for nerve they certainly were ahead of anything seen in that section for some time. When the conductor asked for their fare they coolly told him they had no money, and of course they were dumped at the side of the track. As they left the car they told the conductor that they intended to reach the park in that way, for, before leaving the car, they had been carried possibly half a mile, and they would just sit down and wait for the next car and serve the conductor in the same way. It might have been a good idea if the conductor had held them and taken them to the park and delivered them to the police for prosecution for attempting to defraud, or for jumping on a moving train, if street railways come within the statute. Now fares are collected as soon as the passengers are seated.

TURN ABOUT IS FAIR PLAY.

In a certain Iowa city several years ago about the time of the introduction of electric traction were two electric roads. At the overhead crossings were placed the old style Edison insulated crossovers with plain wood for insulation. Whenever it rained the insulation fell to zero and the power plants of the two roads were practically in multiple. After a time, when this occurrence got to be an old story, it was customary for whichever power station found it out first to shut down and let the other fellows run the two roads a while. Sometimes one road would find it out first, sometimes the other. At any rate they managed to even matters up in the long run. Telephone messages between the offices of the two companies often ran something like this:

"Hello! Is this the X. Y. Z. road?"

"Yes."

"This is the A. B. C. road. Say, we're getting tired of running your road. Been running it all the morning. Why don't you get out and fix your confounded old crossings?"

"That's all right. We run your road all last evening. You fellows want the earth."

We do not guarantee the absolute truth of this story, but the man who told it to us was on the spot at the time, and is one of the most truthful electricians in the United States. Further than this we say not.

The contract for the electric trucks for the Lake Street Elevated Railway has been awarded to the McGuire Manufacturing Company, Chicago.

RIGHT AND WRONG WAY TO START A CAR.

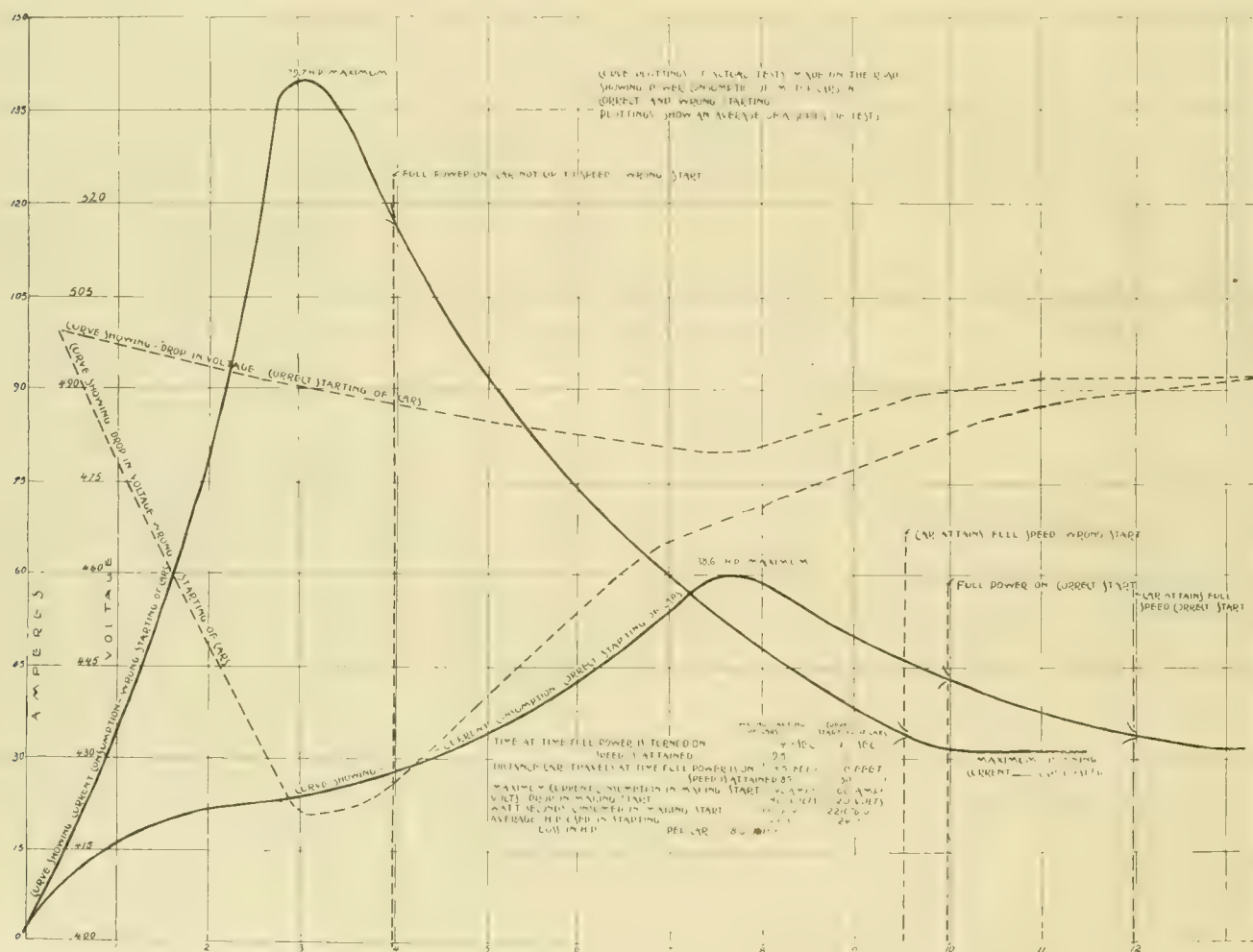
Graphic Illustration of How Useless It Is to Abuse a Car.
Peculiarities of the Series-Parallel Controller.

The abuse of motors by too rapid handling of the controller has been harped on ever since electric roads were first started and every competent superintendent realizes the importance of educating motormen not to turn on current too fast. At the same time nearly every superintendent laments the difficulty of getting men to observe at all times the rules about slow starting.

It is seldom that the difference between a correct and a too quick start is illustrated as graphically and unmis-

recognize the peculiarity of this method of control. While the initial starting current is not very high with this kind of controller there is a sudden rise when the change is made from series to multiple, and particular care needs to be taken not to throw in multiple until the car has attained its full acceleration with the motors in series. The somewhat startling results shown by the upper curve in the diagram are caused mainly by throwing in multiple too quick.

One of the most interesting and encouraging things about the diagram is the small gain in time which is made by the wrong start. There has been a constant tendency of late years toward quick starts in order to make a fast



takably as in the accompanying diagram, which represents the results of a series of tests made on the Chicago City Railway by G. W. Knox, electrician. Blue prints of this diagram are posted at all the car barns for the benefit of motormen. By insisting on the observance of the lesson which this diagram teaches, and by suspending for a few days those who refuse to learn, the current output per car at the power station has been reduced by a large percent. This of course also means a saving in repairs.

A series-parallel controller requires a very different handling from the old style rheostat and in some cases motormen and those who educate them do not seem to

schedule. A heavy starting current has been considered as something which could not be avoided in this connection. Mr. Knox's investigations show, however, that if the controller is handled right there is very little time lost by the correct as compared with the incorrect start, while there is an enormous saving in current and consequent strain on the motors.

The facts brought out by the tests have, of course, been known in a general way by electrical engineers for some time, but they are not often put in such definite shape as here and consequently they are not as fully realized and acted upon by all concerned as they ought to be.

STREET RAILWAY LAW.

EDITED BY FRANK HUMBOLDT CLARK, ATTORNEY AT LAW, CHICAGO.

Assignment of Right of Action for Personal Injury.

Where one injured by a street railway company contracted with an attorney for the prosecution of her claim upon a contingent fee, it was held that the contract was good, and part of the claim having been assigned to the attorney, of which the railway company had notice, the company settled with the person injured at its own risk.

In the opinion of the Court, Shepard, J. said:

It was said in *Newkirk v. Cone*, 18 Ill. 449, that our statute (Sec. 27, Ch. 38, Hurd's Rev. Stat.), defining and providing for punishment of maintenance, under which general name champerty is embraced, seems to have abolished the common law offense with its divisions and distinctions, and to have substituted, in its stead, a statutory offense under the general name of maintenance, and holding, in that case, that there is no law, or public policy in this State which would deprive a person, claiming a right, from contracting to pay for legal services in vindicating it, a stipulated portion of the thing, or of the value of the thing when recovered, dependent solely upon recovery, instead of paying, or contracting to pay, absolutely, a sum certain, has never, to our knowledge, been certainly receded from.

A possible distinction might exist if the attorneys were to agree to carry on the litigation at their own cost and expense: *Phillips v. So. P. Commissioners*, 119 Ill. 626.

The same element, that the attorney agreed to "pay all necessary expenses" in prosecuting the claim, existed in *Thompson v. Reynolds*, 73 Ill. 11, where *Newkirk v. Cone* is reviewed and distinguished from that case, but not, necessarily, over-ruled.

Smith v. Young, 62 Ill. 210, was a case where the Supreme Court upheld the contract, although the attorney there agreed to pay all necessary expenses and costs himself.

We agree that the decisions in this state seem to vacillate upon the question, but, without indulging in an extended review and comparison of them, it appears to us that no one of them goes so far as to hold that a contract like the one in question is void as being champertous; and we are not inclined to go to that extent: *Dunne v. Herrick*, 37 Ill. App. 180. The changed conditions and better civilization of to-day as compared with what existed in England, when the common law rule prevailed afford reason, as held in many States, for the material restriction of that doctrine: *Clark's Crim. Law*, Ch. 13 p. 324. As said in *Newkirk v. Cone*, supra; the suitor may be unable to pay in advance, and without credit, or he may deem such an arrangement (for a contingent fee) most prudent and best calculated to insure vigilance on the part of his counsel; and if he has a cause of action the courts are and should be open for its legal prosecution.

The other contentions of the appellant require but slight mention in the view we take of what was done and agreed to be done, by Mary Butler, by the terms of said

agreement with appellee. Whatever may be the law with regard to the assignability of a right of action for a personal injury, concerning which there are numerous authorities of great weight on both sides, there ought not to be much dispute that the assignment in this case of an interest in the right of action, which was to be prosecuted in her name, together with an agreement to assign a corresponding interest in the judgment which should be recovered in the future, upon such right of action, worked an equitable assignment of the specified interest of that judgment, the moment the judgment was perfected, upon the principle that in equity that which is agreed to be done will be considered as done: 1 Story's Eq. Jur. Sec. 64; *Freeman on Judgments* (12 Ed.), Sec. 425. An equitable assignment is such an assignment as gives the assignee a title which, though not cognizable at law, equity will recognize and protect, and to support such an assignment there must be an actual appropriation of the fund or of some designated part, proportion or per cent of it: *Story v. Hull*, 143 Ill. 506.

We think there was here what was equivalent, in equity, to an assignment of a definite proportion of the judgment that was recovered, and that if the appellant had notice of such assignment, the payment of the whole judgment to Mary Butler was made at its risk. Whether there was a sufficient allegation of notice to appellant of the rights of appellee under the contract in question is a serious question with us.

The allegation of notice was as hereinbefore quoted, and omits all mention of to what agent or officer of the appellant corporation notice was given: *Evans v. Schriver Laundry Co.* (No. 5319), filed Dec. 20, 1894; *Primmer v. Patten*, 32 Ill., 528; *Newell v. Board of Supervisors*, 37 Ill. 253; *Trustees of Schools v. Otis*, 85 Ill. 179; *Schultz v. Plankinton Bank*, 40 Ill. App. 462. But as the appellant has not argued nor even alluded to the question of want of notice, in its brief, we will presume that, even though the errors assigned are sufficient to cover it, the question is waived or abandoned.

W. St. L. & P. R. R. Co. v. Mc Dougal, 113 Ill. 603; *City of Mt. Carmel v. Howell*, 137 Ill. 91. The decree of the Superior Court is affirmed.

Mr. Presiding Justice Waterman dissenting.—The contract of assignment upon which the decree in this cause is based, is not, in my judgment, such an one as the law favors or a court of equity will enforce against persons not parties thereto.

The contract is not of a claim or right of action against any particular person, but is of a roaming nature, authorizing the attorney to go forth "seeking whom he may devour," and to bring and prosecute diligently to final settlement, not judgment, such suits or legal proceedings as he may deem necessary. It is manifest that if this instrument be valid and enforceable, its validity has not

yet been exhausted, and who may be the next victim of this omniverous power of attorney no one can tell.

Neither public policy, court of law or equity have ever leaned to the fomenting of litigation, or to the discouragement of settlements out of court. So far as there is any definiteness in the contract under consideration, it would seem to be of a right of action against certain employes of the North Chicago Street Railway Company, by whose negligence, not that of the Street Railway Company, an accident to Mrs. Mary Butler, it is said, was caused.

One-half of this right of action, Mrs. Mary Butler purports to assign and "agrees not to compromise or settle said claim or to have any dealings with any persons in reference thereto other than said attorney." Rule C. C. C. C. I. expressed in *Greenhood on Public Policy*, p. 474, is a contract by which the control of the party in interest over the litigation carried on in his behalf, is limited, is void: *Boardman v. Thompson*, 25 Iowa 487; *Elwood v. Wilson*, 21 Iowa 523; *Lewis v. Lewis*, 15 Ohio 715. It is urged that if contracts of this kind are not sustained, then whomever may receive an injury through the negligence of another will be remediless.

How this follows is not explained, unless counsel mean to insist that every poor person who received a personal injury is dishonest, and that no lawyer can or will rely upon the promise of such person to pay him a fair fee for successfully prosecuting his claim to judgment.

That a rule of law should be established by which the army of small employers, farmers, grocers and others, the multitude of individuals who must engage and become liable for the negligence of servants, are to find in each case, great and small, petty and important, that all right of honest, fair and just settlement with an injured party has been contracted away to professionals, is not to my thinking in accordance with the welfare of the injured individual, or sound public policy.

(Appellate Court of Illinois. *North Chicago Street Railway Company vs. Ackley*, 27 Chicago Legal News 348.)

Time to Board Car—Injury to Passenger.

The duty devolving upon those in charge of a street car which has stopped at a point usual for taking on passengers, to give ample time for passengers to board the car, is not limited to those who have signaled the car, but includes all others desiring to take passage.

A passenger attempting to board a street car which starts after she has her foot upon the step and her hand upon the railing is not guilty of contributory negligence in continuing her hold upon the car after it starts, as being placed in sudden peril by the negligence of the street-railway company, she is not held to strict accountability for her mode of action.

(Appellate Court of Illinois, *Joliet Street Railway Co. vs. Duggan* 45 Illinois Appellate Court Reports 450.)

Driving onto Cable Track—Descending Grade.

It is not, as a matter of law, negligence for one to continue to descend with a heavy load a steep grade cross-

ing a street railway without fixing a lock chain to the wagon which breaks after the descent is begun.

One was not guilty of negligence, as a matter of law, in being upon a cable-railway track at the time of a collision with a car, where he could see the track for a distance of 100 feet and saw no car approaching immediately before the accident, which was due to the fact that the car could not be stopped within that distance after an alarm given.

(Supreme Court of California, *Cross vs. California Street Cable Railway Co.* 36 Pacific Reporter 673.)

Statutory Limitation of Franchises—Expiration of Charter—Power of City to Grant Use of Streets.

The limitation of thirty years in the Michigan statute upon corporate franchises does not enable a city to grant an easement to a street railway company in its streets for the full term of thirty years although the life of the company expires before.

The acquisition of property for the enjoyment of the franchises to operate a street railway in city streets does not make such franchises property which will exist beyond the corporate life.

An extension of the right to occupy a street to a street railway company, invalid as extending beyond the life of the company, is valid *pro-tanto* to the expiration of the charter, if the company chooses to rely upon it in that respect.

The right to grant to a street railway company the occupancy for thirty years of the streets of a city can exist only by direct and express authority from the legislature.

Under a general charter power to regulate the use of its streets, a city may permit or license a street railway company having the requisite franchises from the State to lay its tracks in the street and run its cars thereon, but cannot by virtue of such power agree that such use shall continue for a definite term of years, or grant an easement in the street.

The provision of the Michigan General Railway Act, Sec. 13, for consent by a city that a street railway company shall construct, maintain, operate and "own" a street railway in the streets, does not authorize the grant of an easement in the streets to extend beyond the life of the franchises of the company.

The power of consent to the construction of a street railway in city streets, to be exercised by a city under the Michigan statute, is limited in time to the life of the franchises of the company, and such easement will expire with the corporate life of such company.

The power to consent to the construction of a street railway through city streets, indirectly conferred upon cities by the Michigan Tram Railway Acts, necessarily implies power in the city to grant an easement in the streets to street railway companies.

The existence and continuance of an inseparable easement and franchise to construct a street railway in a street are not forfeited and destroyed by the actual ownership and enjoyment of such easement and franchise by a street

railway company which purchases them without power to take and enjoy them, when they have subsequently been purchased by another company which has the capacity to receive such easement and franchises.

Street railway companies are not within the exception to, but come within the inhibition of, Mich. Const. art. 15, sec. 10, providing that no corporation except for municipal purposes or for the construction of railroads, plank roads and canals, shall be created for a longer period than thirty years.

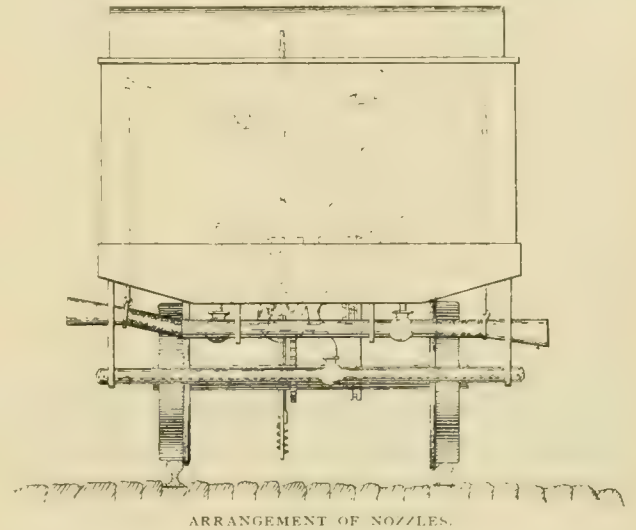
(United States Circuit Court, Eastern District of Michigan. Detroit vs. Detroit City Railway Co. 56 Federal Reporter 867.)

NEW IDEA IN SPRINKLERS.

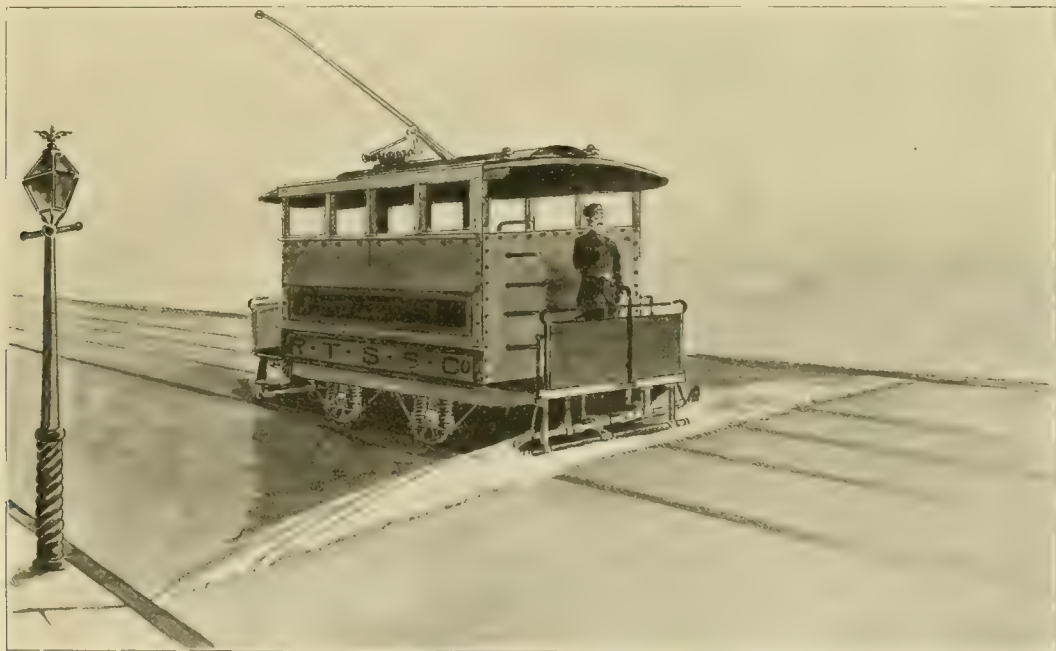
Where the entire width of a street is sprinkled by a sprinkling car it has generally been necessary to mount the tank with its bottom some distance above the car floor in order to give the water a head sufficient to do good work when the tank is nearly empty. A very ingenious way of getting around this difficulty has been devised by L. W. Campbell, an attorney of Waco, Tex., and general attorney of the Texas Central Railroad.

The car has two sets of sprinklers. The first consists of a gravity sprinkler, being an ordinary perforated cross pipe connected by an independent pipe with the bottom of the tank and attached to both ends of the car as shown in the drawing. This is designed to sprinkle that part of the street traversed by the car, and as far beyond its sides as the force of gravitation will carry the water. The flow of water into this sprinkler is regulated and controlled by suitable stops and valves. The second sprinkler consists of a distributor operated by the pump, being a pipe extending across both ends of the car which has at either end a fan-shaped nozzle constructed so as to

throw a vertical spray. This pipe is provided with a flexible joint a suitable distance from each nozzle with proper hand-levers and connections so that the range of the sprays being projected from these nozzles may be elevated or depressed at pleasure, whereby a wide or narrow, curved or crooked street may be sprinkled regardless of the location of the track; that is, whether it be in the center or to one side of the street. The water



which feeds the pressure distributor is taken from the tank by an independent pipe and carried into a reciprocating force pump actuated by the traction of the car wheels, and by this means the flow of water is sufficiently accelerated to reach the desired distance and to cover that part of the street not covered by the gravity sprinkler. The out-put or volume of water being projected from the nozzles is controlled by a slotted arm pivoted beneath the car and vibrated by the crank shaft, which is operated by the car wheels. A rod is connected at



NEW IDEA IN SPRINKLERS.

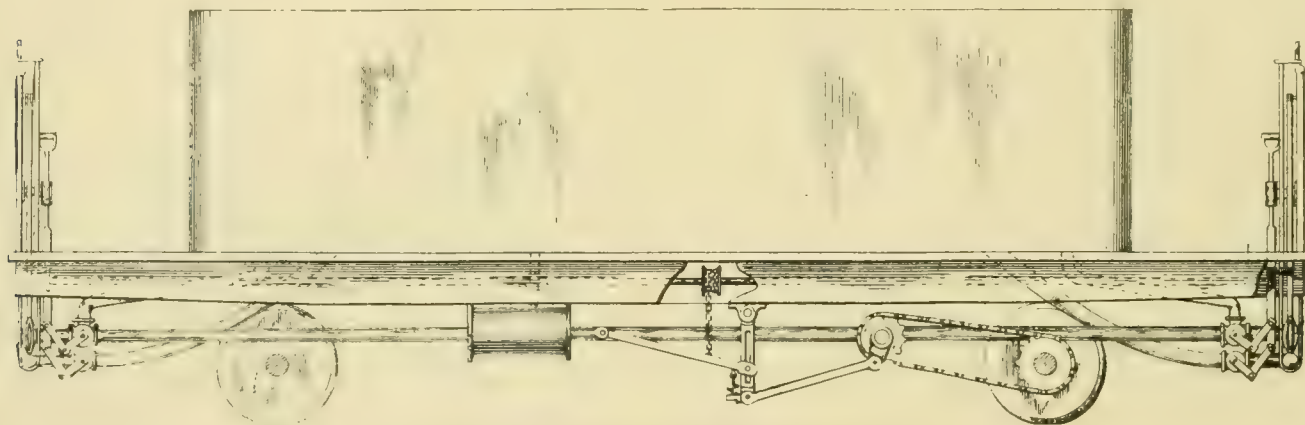
one end to the pump's piston and at the other end to the slotted arm with suitable means to elevate and depress the end of the rod in the slotted arm by means of a crank on the platform, thereby lengthening or shortening the stroke of the pump's piston or stopping the piston altogether. By this simple means the motorman has entire control of the action of the pump and all parts of the machine from his position on the platform of the car. Both sprays are subject to control by suitable valves and stops operated from the platform. There are no projections from either side of the car. The car may be oper-

extras, swings and trippers, in talking over their experiences, as if they had been brought up in the atmosphere of the car barns.

It was a paying idea, which is practical in most places.

THE MICHIGAN ELECTRIC COMPANY'S CHANGE.

The Michigan Electric Company, of Detroit, has become the selling agent of General Electric machinery for the state of Michigan. The General Electric Company



CONTROLLING MECHANISM—NEW IDEA IN SPRINKLERS

ated by one man. Any number of trail cars may be attached to the main car by hose connections. The jets or sprays are thrown so near the surface that there can be no interference with passing teams and vehicles.

WOMEN TOOK THE FARES.

Joseph B. Marvin, general manager of the City Electric Railway Company, Rome, Ga., hit on a novel plan as a revenue producer, and turned all the cars of his company over to the women for a day, who were given one-third of the net proceeds for the building fund of St. Peter's church. All the regular conductors were given a day off and a new extra list consisting of ladies, took the place of the regular list. There were so many women interested that there were three to each car, one married lady and two unmarried. It would hardly have been safe to put the women on the front platform, so the regular motormen were at their posts.

The girls put on their best gowns and sewed bands of ribbon on their most becoming hats with the word "conductor" in large letters in the center. They took the town by storm. Business was practically suspended, for the young women would stop the cars to compel their young gentlemen friends to ride. "If you don't," they said, "I'll never speak to you again," and the young man seeing a dearth of winter enjoyments ahead of him, if he did not comply, yielded to temptation, and rode.

The women worked faithfully until 11, P. M., in swings of two hours each. They naturally became very technical in their speech, so that they now speak of regulars,

will, in consequence of this, close its former Detroit office. This is an arrangement which seems to be to the mutual advantage of the companies concerned. The Michigan Electric Company has been very successful since its incorporation two and a half years ago. The "Michigan" overhead material will still be handled by this company as it is too good a line to relinquish. H. E. Baldwin, formerly representing the General Electric Company in Kansas, Missouri and Oklahoma, will look after the state trade and L. J. Baldwin will have charge of the sales at the office.

Sargent & Lundy, Monadnock Building, Chicago, are consulting engineers for the Toledo Traction Company, Toledo, which has consolidated all the electric lighting and street railway lines, except the Robison system. They have let contracts to Hoadley Bros., Chicago, for 4 cross-compound condensing Green-Wheelock engines of 1,250-horse power, made by the American Wheelock Engine Company, Worcester, Mass., built at the Cramp Works, Philadelphia, and equipped for the Hoadley patent compound wind system of rope transmission; 2 Heine boilers of 500-horse power; 4 Sterling boilers of 350-horse power each, being transferred from the old power house to the new; 3 G. E. 500 Kilowatt generators direct connected to be run at 90 revolutions a minute; 2,000-horse power of fuel economizers to Stanley Green, Marquette building, Chicago, for the Fuel Economizing Company, Matteawan, N. Y.; 6 Hawley down draft furnaces, Chicago; 20-ton traveling crane, Brown Hoisting & Conveying Company, successors to the Yale-Towne Company.



Interesting Bits of Information from all Parts of the Country,
Boiled Down for Busy Readers.

On October 1, nine mail cars will be put on the Third Avenue cable line, New York.

It is proposed by the postoffice officials to have a small pennant on all street railway cars carrying U. S. mails.

Horace S. Cummings is reported to be organizing a company to utilize the water power of Little Falls on the Potomac river, near Washington, D. C. The plan proposed is similar to the Niagara Falls project.

It has been suggested that conductors on lines that run through picturesque routes, describe points of interest, an extra 5 cents being collected from each passenger. Cars with the descriptive conductor could be designated so that those who do not care to avail themselves of the guide's services can take another car.

Columbus, Georgia, motormen and conductors want an ordinance passed making it a misdemeanor for persons not wishing to ride, to signal by whistling or otherwise for cars to stop. Considerable annoyance has been caused by this practice, and if the city council passes the ordinance, it will be strictly enforced.

Requests are received almost daily by the postoffice department from postmasters, who desire to supply carriers with bicycles, retaining as an offset a percentage of money appropriated for street car fare. The department denies these requests, but allows each carrier \$2 to \$3 a month for wheel repairs, during the riding season.

J. B. McClary, superintendent of the Birmingham Railway & Electric Company, is advertising his company and its attractions at all points within 100 miles of Birmingham Ala.; cards are placed in all railroad stations calling attention to "East Lake, Avondale and Red Mountain parks—music, boating and fishing." The East Lake Dummy line is rapidly being changed to electric.

Joel Hurt, president of the American Street Railway Association, and of the Atlanta Consolidated Street Railway Company, has created a fund for the benefit of employes instead of increasing wages. A certain percentage of the fares, and all of the fines imposed for violations of company rules, are to be divided among the men at the close of the Cotton States and Industrial Exposition.

Motorman Doc Thomas, by his coolness and fertility of resource, saved a car load of passengers from being cut in two by a steam road train at East Liverpool, Ohio.

The trolley came off as the car got across the first rail, the electric warning bell being silent. Reversing the current, the motorman rushed back, put on the trolley and the car moved back just in time to escape the engine of death.

He must indeed be skillful who can comply with the notice which is said to be posted in the cars of Philadelphia: "Remain seated until the cars stops, and then get off in the direction the car is moving." Certainly this is an invitation to receive personal injuries, for how can a car be stopped and moving at the same time. Most roads would be glad to prevent people from leaving moving cars.

In Philadelphia, where the trolley parties have reached the highest stage of development, the conductors make tunnels to order. When the suburbs are reached, and there is a clear stretch of track, the lamp circuit is cut out. This feature has proved quite an attraction, and may assist the development of the trolley parties on other lines. This kind of tunnel is less expensive than the regulation variety of masonry, and just as effective, is not so damp and is without smoke, possessing many other advantages.

The London Street Railway Company, London, Ont., is at work on the conversion of its system and expects by September to have the main line running. An extension to Water Works Park and Springbank, about three and a half miles down the Thames river, was finished August 1, and placed in operation. The equipment consists of twenty-five Canadian General Electric Company motors; car bodies by Patterson & Corbin, St. Catharines; Blackwell trucks, Montreal; wheels and axles by St. Thomas Car Wheel Company.

The Belle City Street Railway Company, Racine, Wis., has adopted a new plan of collecting transfers. A time check is given, good only on the next car arriving at the transfer point. They are collected by the motorman before the car starts, and those without transfers are compelled to pay fare. This plan has saved many dollars, and is more comfortable for passengers, as the cars are not crowded with persons who have taken advantage of the longer time of the transfers, as was formerly the case. The chief advantage to the company is that no one not entitled to it, can now obtain a transfer.

For the first six months of 1895, the Galveston City Railroad Company, Galveston, Texas, makes a good showing, each month's record marking an increase in receipts above the corresponding month of 1894. The gross earnings for 1895 were \$98,788.93, and for 1894, \$90,708.10, an increase of \$8,080.83. The expenses for 1895, were \$62,703.57, and for 1894, \$61,402.93, an increase of \$1,300.64. The net earnings for 1895 were \$36,085.36, and for 1894, \$29,305.17, a net increase of \$6,780.19. President and Manager W. H. Sinclair certainly ought to be satisfied with his six months' work.

FINEST CAR IN THE UNITED STATES.

"This car without doubt is the handsomest and most modern of any now being operated as street railway cars, and is pronounced by all who have seen it as the finest in the United States." Such is the closing sentence of a letter from Isaac Blum, president of the Hestonville, Mantua & Fairmount Passenger Railroad Company, Philadelphia, describing the party trolley car, "Mascot," which is in constant demand.

The car is 30 feet long with centre aisle, and 18 cross seats. At each end is a small table on which refreshments are served, the caterer occupying the adjoining seat. There is no running board, so that passengers are compelled to enter and leave by the rear platform, the sides being protected by an ornamental wrought iron



BUILT FOR TROLLEY PARTIES.

gate. The car is handsomely illuminated by 4 rows of various colored incandescent lamps all around the car and down the frames. The headlight is a maltese cross composed of colored lights, while on top of the hood at each end of the car the word "Mascot" is brilliantly illuminated. There are 275 lamps required.

The charge for use of the car, including motorman and conductor, is \$10 a round trip of 17 miles, which occupies 1 hour and 37 minutes. The car is run to any point on the road which is most convenient for the party, but in cases where a large number of cars are chartered, the excursionists usually go to the depot, where the cars are loaded and sent out on the street in such a manner as not to interfere with the regular schedule. With a single car party interference with schedule is prevented by running the car between two regular cars with instructions not to run at a too high rate of speed to crowd the regular car ahead.

Twenty-five cars like the "Mascot" are in use constantly by trolley parties. They were built by the St. Louis Car Company, St. Louis, and equipped with Peckham Motor & Wheel Company's long extension standard trucks, G. E. 800 motors, series 7 parallel controllers. The seats are the latest pattern rattan, Hale & Kilburn walk-over.

Parties have reached their highest development in Philadelphia where several carloads belonging to one party are frequent. Last month a party was given for charity which used 61 cars, run in sections of five cars. Complaints have been made that some parties are too noisy, so the police have taken a hand. Cars containing trolley parties are used as targets by small boys, who throw stones and other articles. In Baltimore an effort has been made to break up this nuisance by having policemen in citizens dress accompany the car to arrest offenders. The other night a Philadelphia trolley party was stopped by piles of sand on the tracks. Small boys had noticed that particles of sand on the tracks caused sparks to fly when a car passed. Reasoning that the more sand the bigger the spark, they proceeded to cover the rails. Much to their surprise there was no spark at all, but the car had to stop, and they had their fun watching the vain efforts of the motorman to start her, before he learned what was the matter.

It is particularly pleasing to the REVIEW to note the increase in trolley party business throughout the country. As we are the first publication to suggest methods of creating travel on street railways, we early thought of trolley parties, which were then unknown, and three years ago showed how it would be possible to serve refreshments in the same way as is done on the Hestonville road.

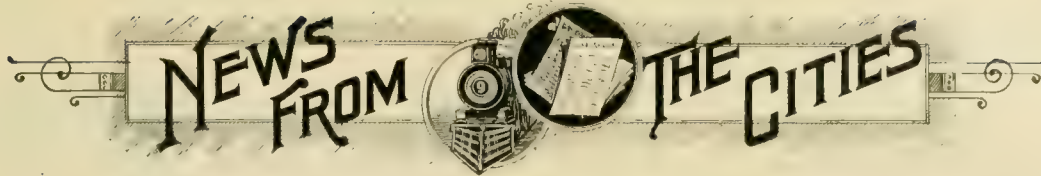
GOT EVEN WITH TEAMSTERS.

J. E. Thielson, general manager of the Portland Consolidated Street Railway Company, Portland, Ore., got even with some teamsters not long ago, who persisted in blocking the track. They seemed to enjoy annoying the motormen, and delaying traffic by refusing to leave the tracks. They got so bold one day that those who were hauling material for a new building blocked nine cars. Mr. Thielson happened along and straightened out matters by running a car to the spot where the teams were obliged to go, and stopped it until the car following came up. The passengers were transferred to the one in front and the other run to the place left by the first. This was kept up for several hours, ending in effectually cowing the obstreperous teamsters.

CERTAINLY NOT.

The Barnes, Kan., "Chief" would like to know if it is any harm for a person to get on a street car and go to the park on Sunday to hear the band play.

An ambulance street car is proposed for the French hospital, San Francisco.



Alabama.

LAFAYETTE, ALA.—John L. Cowan is about to construct a dummy line to Opelika. He has just completed the Opelika and Auburn electric line.

MONTGOMERY, ALA.—The West End & Riverside Park Electric Railway Company was bought at foreclosure by Philip F. Kobbe and Stuart Lindsley, who control 96 per cent of the bonds.

Arizona.

PHOENIX, ARIZ.—Fowler Bros. have been granted a franchise to build 18 miles of electric railway from the city to their land.

Arkansas.

PARAGOULD, ARK.—Capt. M. F. Collier, Hon. J. D. Block and W. A. H. McDaniel are interested in a project to build an electric freight railroad.

LITTLE ROCK, ARK.—A trust deed for \$450,000 has been filed by the Pulaski Traction & Electric Company, to secure 6 per cent maintenance bonds.

California.

SACRAMENTO, CAL.—The Fair Oaks & Orange Vale Railroad Company, electric, which was recently incorporated by L. T. Hatfield, Capt. T. B. Hall, Geo. M. Mott, William Shaw and F. E. Cox, has bought the franchises of the Central Electric Company and will build.

SAN FRANCISCO, CAL.—The Iron Mountain Railway Company has been incorporated to build an electric road in Shasta county, from the Iron Mountain mines, 13½ miles, to Spring Creek, on the California & Oregon Railroad, with a 4-mile branch to Copley. The greater part of the capital is from England, and three of the directors, Messrs. Parrott, Eels and O'Shaughnessy, reside in San Francisco.

SANTA BARBARA, CAL.—The Santa Barbara Consolidated Electric Company has been incorporated to build a street railway. Capital, \$200,000; directors, A. Hope Doeg, president; S. J. Keese, Los Angeles, vice-president; N. F. Ashton, secretary and treasurer, Santa Barbara; W. F. Reed, Santa Barbara, manager; B. S. Hayne, J. O. Coit, C. C. Newman, Santa Barbara; P. C. Higgins, of Carpinteria, and J. V. McMullan, of New York.

Canada

BARRIE, ONT.—The Barrie & Allandale Electric Street Railway Company has applied for incorporation to build in Barrie. Capital, \$50,000; incorporators, J. H. McKeggie, J. Vair, C. Reedy, S. J. Sandford, J. Dickenson, all of Barrie.

NIAGARA FALLS, ONT.—The Niagara Falls Electric Street Railway Company has been incorporated with \$125,000 capital, by Alexander Manning, Hume Blake, Z. A. Laish, P. A. Manning, Toronto, and Charles Black, Welland.

Chicago.

CHICAGO.—The Chicago City Railway Company has been granted a franchise for an electric line on Clark street from Adams to Twenty-second street.

CHICAGO.—The Chicago City Railway Company has been granted franchises for 29 miles of new electric lines, and to change 10 miles from horse to electric.

CHICAGO.—The Chicago Passenger Traction Company has applied for franchises over county roads. P. H. Haynes is president and William U. Riley, secretary, room 27, 97 Clark street.

CHICAGO.—It is reported on the Stock Exchange that an attempt is being made to consolidate the South Chicago City Railway Company and the Calumet Electric Railway Company.

CHICAGO.—The Calumet Electric Street Railway Company has applied for franchises for about 30 miles of track. The larger portion of the proposed lines are in the district occupied by the South Chicago City Railway Company.

CHICAGO.—The General Transportation Company has been incorporated to operate street railway cars and do many other things. Capital, \$200,000,000; incorporators, Adolph Boysen, Henry C. Miller and Edmund F. Barton.

CHICAGO.—Again it is reported that the Illinois Central Railroad Company will adopt electric traction on its suburban system. John Dunn, assistant to the president, says the company is considering the matter, but he does not know how far it has advanced.

CHICAGO.—The Evanston Electric Railway Company has been incorporated with \$200,000 capital, by Andrew Crawford, Thomas C. Milled, Parke E. Simmons. It is proposed to build from Emerson avenue, the terminus of North Shore Electric road, to the limits of North Evanston.

CHICAGO.—The Suburban Electric Company filed its bond of \$20,000 with the town of Cicero, and accepted the ordinance giving right of way on Harrison street, Robinson avenue, Twenty-second street, Riverside Boulevard and Hiawatha avenue. James W. Kenney and Homer K. Galpin, Tacoma Building, can give information.

CHICAGO.—The Siemens & Halske Electric Company of America has elected A. W. Wright, president; Charles E. Yerkes, vice-president; F. B. Badt, secretary; O. W. Meysenburg, treasurer; directors, Arnold von Siemens, George von Siemens, Berlin; O. W. Meysenburg, Charles E. Yerkes, W. F. Furbeck, David B. Lyman, F. B. Badt, Chicago; Martin Maloney, Philadelphia.

CHICAGO.—Burnham & Co., architects, Rookery, will let contracts for constructing the power house for the Toledo Traction Company, Toledo, Ohio. The engine room will have steel columns and steel roof. Sargent & Lundy, Monadnock Building, will let contracts in two or three weeks for shafting and appurtenances for driving electric light machinery; also coal and ash conveying machinery and appurtenances, and piping.

Colorado.

DENVER, COLO.—The sale of the Denver City Cable Railroad will take place August 22.

COLORADO SPRINGS, COL.—The Garden & Glen Electric Railway Company is being organized to build two miles of electric road from Colorado City, where it will connect with the Colorado Springs Rapid Transit tracks, to the Garden of the Gods. W. A. Love, Robert Finlay, R. M. Chambers, E. S. Rice and Mary A. Neff are interested.

Connecticut.

HARTFORD, CONN.—The Hartford Street Railway Company will build a car barn at East Hartford.

WESTPORT, CONN.—The Westport & Saugatuck Horse Railroad Company has increased its capital to \$100,000.

NEW BRITAIN, CONN.—The Central Railway & Electric Company will extend its line to Newington Center, there to connect with a proposed line from Hartford.

MANCHESTER, CONN.—The Hartford, Manchester & Rockville Tramway Company will build a power house this fall.

THOMPSONVILLE, CONN.—The Enfield & Longmeadow Electric Railroad Company will complete its organization, having adopted amendments to its charter passed by the General Assembly.

NEW HAVEN, CONN.—The Manufacturers Street Railroad Company has been granted a franchise. A. J. Connor was sponsor for the ordinance. The line will be constructed this season and will carry freight.

Delaware.

DOVER, DEL.—The Dover & Milford Electric Railroad Company has been granted right of way over public roads in Kent county.

District of Columbia.

WASHINGTON, D. C.—Contracts will be awarded July 20, for the construction of the Washington & Maryland Railroad.

WASHINGTON, D. C.—Samuel R. Adams, of Camden, S. C., has been awarded the contract to construct the Washington & Great Falls Electric Railway.

WASHINGTON, D. C.—Citizens near the North Tokoma terminus of the Brightwood Railway Company have offered to donate the right of way for an extension.

WASHINGTON, D. C.—The Washington & Georgetown Railway Company and the Rock Creek Railway Company will be consolidated as the Capitol Traction Company with \$10,000,000 capital.

ANACOSTIA, D. C.—An extension of the Anacostia & Potomac River Railway will be built by Arthur E. Randle, Augustus Burgdorf, Clarence F. Norment, all of Washington, and capitalists of Philadelphia and New York. It is said that Mr. Randle and his associates have bought a controlling interest in the Anacostia Company.

WASHINGTON, D. C.—J. B. Colegrove, president of the Takoma, Burnt Mills & Sandy Spring Railroad Company will purchase an electric lighting plant for the steamer City of Richmond, including 300 incandescent lamps and search light of 3,000 to 5,000 candle-power. Bids will be considered at once, and for both new and second-hand equipment.

Florida.

OCALA, FLA.—J. R. Martin and H. L. Anderson, the projectors of the new electric road have sold \$6,000 of first mortgage bonds and will begin work.

JACKSONVILLE, FLA.—The officers of the Jacksonville & Tampa Bay Improved Railway Company, which will probably build to St. Augustine this season, are Crosby Thompson, president; E. M. Hammond vice-president; T. J. Appleyard, secretary and general manager; O. O. Ringle treasurer.

Illinois.

ROCKFORD, ILL.—The city will build an electric light plant to cost \$65,000.

BELVIDERE, ILL.—J. B. Canterbury, La Crosse, Wis., will probably build an electric line here.

ROCKFORD, ILL.—John Farson, Chicago, has been appointed receiver for the West End Street Railway Company in foreclosure proceedings.

DUNDEE, ILL.—The Dundee Rapid Transit Company has been succeeded by the Elgin Illuminating Company. The same parties are in control.

OTTAWA, ILL.—A receiver for the Ottawa Electric Street Railway has been applied for by two of the bondholders, Charles Witt of Ottawa and Charles Hannan of Omaha. The liabilities include \$75,000 first mortgage bonds, and \$6,000 to the General Electric Company and Colonel Evans for cash advanced.

IN THE TWENTIETH CENTURY.



"What is a horse, Tom?"

"A sort of an extinct creature that used to haul vehicles in which people rode before electric cars and bicycles were invented."

Indiana.

NEW ALBANY, IND.—The Highland Electric Railway Company was sold to Henry Terstegge, trustee for the first mortgage bondholders, for \$20,000.

LEAVENWORTH, IND.—The construction of an electric railway between Marengo and Cannelton is proposed by the people of Crawford and Perry counties.

KOKOMO, IND.—The Kokomo Electric Railway Company has been granted a franchise to construct a line from Marion to Swayzee. D. B. Sweetser and Ancil R. Smith are interested.

RICHMOND, IND.—The plant of the Richmond Street Railway Company has been ordered sold to satisfy a decree in favor of the Union Trust Company, St. Louis, which holds \$200,000 worth of bonds. Several intervening creditors will lose their claims, which amount to \$50,000. It is said the plant will not bring \$50,000, and as the trust company paid \$180,000 for the bonds, it will be quite a loser.

Iowa.

WATERLOO, IA.—An electric line will be built to Cedar Falls.

BOONE, IA.—S. T. Stanfield, secretary of the Boone Electric Street Railway & Light Company, wants prices on 228 poles, 30 feet long, 7 inches at top, also two miles of overhead construction with five curves and one turnout.

SIoux CITY, IA.—Judge Wakekeld made a decree of foreclosure and order of sale of the Riverside Park Railway Company, on application of the Baltimore Loan & Trust Company, trustees for holders of \$500,000 first mortgage bonds.

DAVENPORT, IA.—The Davenport & Rock Island Railway Company has notified stockholders that it is unable to pay its debts, and cannot continue business without reorganization. It is recommended that a new company with \$600,000 capital be formed to take over the property of the old.

DES MOINES, IA.—The Laird Electric & Transportation Company with \$110,000 capital, and the Hall Electric Power & Transportation Company, with \$510,000 capital, have been incorporated with the following officers for both companies: Robert H. Laird, president; Thomas

M. Hall, vice president; Robert H. Laird, treasurer; Loftus E. Dancey, secretary. The articles came by mail and it is not known where the parties live, but Buffalo is supposed to be the place.

Kansas.

PITTSBURG, KAN.—The Pittsburg, Frontenac & Suburban Electric Railway, of which S. Barratt is secretary, will extend to Chicopee.

TOPEKA, KAN.—The Kansas & Missouri Electric Railway Company has been incorporated to build in Crawford county. Capital, \$25,000; directors, Samuel Barrett, Robert Robyn, A. L. Chaplin, Pittsburg, Kan.; Robert Simons, West Chester, Pa.; L. M. Bedell, Carl J. Simons and Harry W. Bedell, of Chetopa, Kan.

Kentucky.

HENDERSON, KY.—The Henderson Street Railway Company, the owners of which reside in Owensboro, has decided to extend to the fair grounds.

BOWLING GREEN, KY.—J. A. Gaboury, of Atlanta, Ga., has been awarded the contract to convert the Park City horse railway into an electric railway.

MAYSVILLE, KY.—D. S. Hauss has brought suit for \$2,249 against the Maysville Street Railroad & Transfer Company for services rendered as electrical engineer in 1890, during the construction of the road.

Louisiana.

NEW ORLEANS, LA.—Thomas McNally, Pittsburg, has sued the New Orleans Traction Company for \$17,057.72, alleging that the company failed to furnish material at the proper time, thereby causing him considerable trouble by reason of extra work.

NEW ORLEANS, LA.—A 6-mile electric road will be built by the Chalmette Railroad Company. Capital, \$100,000; directors, R. V. Ducross, E. E. Nunez, J. D. Hill, C. D. Armstrong, L. Roy, A. Estopinal, Jr., A. Estopinal, B. Ojea, and J. D. St. Alexandre, secretary.

Maine.

BANGOR, ME.—Gen. H. L. Mitchell is interested in a project to build an electric line to Hampden and Winterport.

PORTLAND, ME.—The Portland Extension Railroad Company has been organized to build an electric line from the terminus of the Portland Railroad in Saccarappa, Westbrook, to Gorham. The directors are William G. Davis, William R. Wood, Charles F. Libby, Portland; Edward A. Newman, Deering; William Wheeler, Brooklyn.

Maryland.

BALTIMORE, MD.—An electric road 2.15 miles long is to be built in Clifton Park for use during the proposed centennial exposition.

BALTIMORE, MD.—Jones, Pollock & Co. have the contract for the Catonsville extension of the City & Suburban Railway system.

BALTIMORE, MD.—William H. Whitridge, president of the South Baltimore Company, has applied to the county commissioners for permission to lay tracks.

TAKOMA, MD.—The Washington, Sandy Springs & Baltimore Electric Railway Company has been incorporated to build an electric railway, and furnish electric light and water power.

BALTIMORE, MD.—George S. Tenney, New York, and A. T. Leftwich, Baltimore, are interested in an electric line from Spartanburg, S. C., to Glendale, Clifton, Whitney and Pacolet. It is reported that bonds have been placed and construction will soon begin.

TAKOMA, MD.—The capital stock of the recently incorporated Washington, Sandy Springs & Baltimore Electric Railway Company is \$1,500,000; and the incorporators are James B. Colegrove, William F. Sliney, Allen Freas, F. Ray Keys and B. H. Colegrove.



CONDUCTOR:—"Move up, please."

JAGLETS:—Shertingly!—Z'hat high enough.

BALTIMORE, MD.—Gov. Brown, president of the Baltimore Traction Company, has been invited to be president of the proposed electric line from Washington to Gettysburg. The scheme includes 120 miles of road through Cooksville, Sykesville, Westminster, Union Bridge, Ellicott City, Eldersburg, Gwynn, Oak Park, Reistertown. Connections are to be made with Baltimore lines.

Massachusetts.

PITTSFIELD, MASS.—The Pittsfield Electric Street Railway Company will extend its line to Dalton.

WESTFIELD, MASS.—The Woronoco Street Railway Company has authorized its executive committee to contract for a complete electrical equipment.

STONEHAM, MASS.—The Mystic Valley Street Railway Company has been incorporated with \$65,000 capital to build an electric line to Arlington via Winchester.

BILLERICA, MASS.—The Reading Electric Railroad Company has applied for right of way. If the petition is granted a company will be formed with \$50,000 capital.

MILFORD, MASS.—The Milford & Medway Street Railway Company has been incorporated with \$100,000 capital to build six miles of electric road, by G. M. Greene, Milford.

SOUTH FRAMINGHAM, MASS.—The Pierce construction Company has the contract for the electric road to Holliston and Milford. By Nov. 1 the line to Holliston will be opened.

SOUTHBRIDGE, MASS.—The promoters of the Southbridge & Fiskdale Electric Street Railway Company have increased the capital to \$60,000 and intend to construct 7½ miles of road.

MILLBURY, MASS.—The Blackstone Valley Electric Railway Company has been formed by F. A. Lapham, of Worcester, Samuel E. Hull, H. A. Ryan and James Ferguson of Millbury, and E. E. Howe of Fisherville. One-fifth of the required \$100,000 has been subscribed.

FALL RIVER, MASS.—Stockholders in the newly incorporated Fall River Street Railway Company have been assessed 40 per cent, payable August 15, on which date construction is to begin. President, W. E. Turner, treasurer, J. T. Robertson; secretary, James F. Jackson.

LAWRENCE, MASS.—The Lawrence & Reading Street Railroad Company has been organized with \$50,000 capital to build 10 miles of electric line through Wakefield, Reading, and North Reading to Andover. The directors are Charles F. Woodward, Daniel G. Walton, Charles H. Spence, Wakefield; Arthur F. Upton, Edward A. Carpenter, North Reading; Newton Jaquith, Andover; Harley Prentiss, Reading.

Mexico.

MEXICO CITY, MEX.—General John B. Frisbee has received a concession for an electric railway from Julipa, on the Inter-Oceanic Railway to Corobo, on the Vera Cruz Railway, passing through an extensive coffee and fruit country. The survey is said to be in progress.

Michigan.

DETROIT, MICH.—The Detroit, Rouge River & Dearborn Railroad Company has been organized by Strathearn Hendrie, Edmund J. Owen estate, Chestnut Ridge Land Company, Herbert M. Snow, Robert McGinnity, Julian G. Dickinson, Albert E. White, Irvine & Wise.

ST. JOSEPH, MICH.—W. Worth Bean has purchased at execution sale the track and equipment of the defunct St. Joseph & Lake Shore Electric Railway, which was built two years ago by J. S. Wolfe and others. Claims against the old concern will be settled by the new owners, who acquired the property in consideration of \$306 and the various judgments. The three miles of line will be thoroughly overhauled.

Minnesota.

FARIBAULT, MINN.—T. J. McCarty and A. R. Miller have applied for a street railway franchise.

ST. CLOUD, MINN.—The St. Paul Title Insurance & Trust Company has applied for a receiver for the St. Cloud City Street Company, interest on \$125,000 worth of bonds having been defaulted.

BRAINERD, MINN.—It is reported that C. N. Parker and E. C. Gibson will consolidate the Brainerd Electric Railway Company, water power, lighting interests, and telephone company, as the Brainerd Public Works Company.

Missouri.

KANSAS CITY, MO.—The Consolidated Cable Company is thoroughly overhauling its power plants.

KANSAS CITY, MO.—The North East Street Railway Company will extend its road one mile to Budd's Park.

KANSAS CITY, MO.—The Dummy Line Company of Independence has been given permission to adopt electricity.

NEVADA, MO.—George Myers, manager of the Nevada Light plant, has secured a franchise for an electric railway.

KANSAS CITY, MO.—The sale of the Union Cable Railway Company which was set for July 6, has been postponed 60 days.

JEFFERSON CITY, MO.—J. C. Fisher, editor of the State Republic, is organizing a company to build an electric line to Columbia.

COLUMBIA, MO.—J. O. Trail, E. W. Settle and E. S. Link, Cedar City, are endeavoring to organize a company to build an electric line to Jefferson City.

LEBANON, MO.—Col. R. S. Scott and Hamilton White, Des Moines, Ia., want to build 75 miles of electric line to Gunter Lake, Camden county, and Bagnell, Miller county, connecting at Bagnell with the Missouri Pacific Railroad.

NEVADA, MO.—H. C. Moore, a prominent citizen of Nevada, and G. A. Dudley, of St. Louis have been granted a franchise to build four miles of electric street railway and operate a 50-lamp lighting plant. The franchise is to be confirmed by a vote of the citizens in August, and will doubtless carry by a large majority.

Nebraska.

BEATRICE, NEB.—Victor G. Lantry, of Omaha, has purchased at master's sale, for \$22,050, the franchise and personal property of the Beatrice Rapid Transit & Power Company. If the sale is confirmed a large sum of money will be expended on improvements.

New Hampshire.

DERRY, N. H.—Charles Bartlett, Derry, and A. H. Wilcomb, Chester, are having surveys made for the Chester & Derry Electric Railway Company, and construction will soon begin.

New Jersey.

CAMDEN, N. J.—The West Jersey Traction Company has petitioned for a franchise in the city streets.

ELIZABETH, N. J.—The Elizabeth Street Railway Company is reported to be preparing to adopt electric traction.

HACKETTSTOWN, N. J.—Daniel Osman and Mr. Randolph propose to build a trolley line to Asbury, in Warren county.

NEWARK, N. J.—The South Orange & Maplewood Street Railway Company has been granted a franchise for its electric line in South Orange.

LONG BRANCH, N. J.—A franchise has been granted in Long Branch to the Atlantic Coast Railway Company, which is to build an electric line to Pleasure Bay and Asbury Park.

NEWARK, N. J.—A trolley line will be built up Orange Mountain by the Freeman Street Improvement Company, recently organized with John Davis, president; Franz Berg, vice-president, and Robert D. Collins, secretary.

New York.

OLEAN, N. Y.—The Olean Street Railway Company will extend to Weston's and Portville.

ROME, N. Y.—The Rome City Street Railway Company will relay its track with heavier rails.

LEWISTON, N. Y.—The power house of the new Gorge Electric Railway has been badly damaged by fire.

SYRACUSE, N. Y.—The Syracuse Street Railroad Company has been granted permission to extend to Woodlawn.

WATERTOWN, N. Y.—The Watertown & Brownsville Street Railway Company is building a reserve power house.

ALBANY, N. Y.—The Albany Railway Company will improve its track and power house. About \$80,000 will be expended.

LITTLE FALLS, N. Y.—The Little Falls Street Railway Company which was recently incorporated, has been granted its franchise.

NEW YORK, N. Y.—The People's Traction Company has been given permission to build 21½ miles of electric railway. Franklin A. Wilcox is president.

SYRACUSE, N. Y.—Belden & Seeley have been given the contract for constructing the Grace & Madison street divisions of the Syracuse Street Railroad Company.



FARMER OATCAKE:—(Hunting through catalogue of Metropolitan Museum of Art)—“No, Samantha, I don't see nothing about this 'ere Greek statue, but I reckon from its looks it must have been some ancient trolley god or other.”

RIVERHEAD, L. I.—Suffolk county capitalists are reported to be organizing to build an electric road from Riverhead to Orient and from Riverhead to Quogue.

SYRACUSE, N. Y.—The Consolidated Street Railway will be sold August 17, under foreclosure of mortgage held by the Central Trust Company, New York.

MT. VERNON, N. Y.—The North Mount Vernon Surface Railroad Company has increased its capital to \$250,000 and will extend its line to Tuckahoe, Bronxville and White Plains.

CHATAUQUA, N. Y.—Attorney A. B. Ottoway, of Westfield, and W. L. Minton, of Dunkirk, have obtained the right of way for an electric railway between Barcelona and Mayville.

ALBANY, N. Y.—E. J. Duggan and others are forming what is to be known as the Albany & Greenbush Railway Company to build a line connecting with the new Troy & Sandlake Railway.

SYRACUSE, N. Y.—It is reported that the Syracuse Street Railroad Company has purchased the Syracuse & East Side Railway Company, and will double track the road to De Witt, besides making other improvements.

KINGSTON, N. Y.—The receivers of the Colonial Electric Railway Company have been granted permission to issue certificates for \$8,207.88 due various persons for supplies, construction, operating expenses, machinery and other items.

ALBANY, N. Y.—The incorporators of the Albany & Suburban Railway Company are F. R. Barnes, Joseph S. Burke, George T. Cunningham, Ballston; George D. Moore, Worcester, Mass; Arthur Hilton, Boston; John Legett, Joseph A. Legett, Albert J. Barnes, Troy; Charles A. Goddard, Lowell, Mass.

WATKINS, N. Y.—The Watkins & Havana Electric Railroad Company has accepted the franchises granted to it and elected John E. Mulford, of Montour Falls, president; Charles S. Frost of Watkins, vice-president; Charles L. Hathaway, of Horseheads, secretary and treasurer, and C. H. Baldwin, of Elmira, general manager.

AUBURN, N. Y.—Edwin F. Voris, George C. Kohler, N. P. Goodhue, Wilson H. Pixley, Charles Dietz, and L. S. Ebright, Akron, O.; J. J. Smith, Cincinnati; H. V. S. Lord, George B. Turner, S. E. Bell, George Underwood, Daniel L. Ramsey, George W. Elliott, Charles P. Mosher, P. M. Heron, Auburn, are organizing the Auburn Inter Urban Electric Railroad Company, with \$250,000 capital, to build to Port Byron, Throopsville, Weedsport, Skeneateles and Island Park.

LITTLE FALLS, N. Y.—The Little Falls & Richfield Springs Railway with \$200,000 capital to build eighteen miles of road from Little Falls to Richfield Springs, and the Richfield Springs & Schuyler Lake Railway Company, with \$20,000 capital, to build one mile of road, have been incorporated. The directors of both companies are: Caleb L. B. Tylee, Frank H. Viele, George E. Tylee, Edwin J. Carpenter, John L. Miller and Thomas J. Mack, of Corning; Theodore C. Bates and William H. Tylee of Worcester, Mass., and H. Arthur Silsbee of New Bedford, Mass.

North Carolina.

ASHEVILLE, N. C.—J. E. Rankin, receiver of the Asheville Street Railroad Company, is in the market for second-hand rails.

Ohio.

HAMILTON, O.—Peter G. Thompson will build a belt electric railway.

DAYTON, O.—The Wayne & Fifth Street Railroad Company has decided to adopt electric traction.

YOUNGSTOWN, O.—The appointment of three trustees for the Canfield Electric Railroad has been asked.

FINDLAY, O.—George B. Kerper has secured absolute control of the Hancock Electric Light Company.

WELLSTON, O.—Frank Blodgett has taken the contract to build the electric road which is backed by the C., H., V & T Co.

AKRON, O.—The Akron & Cuyahoga Falls Rapid Transit Company will extend its lines 20 miles to Doyletown and Wadsworth.

LANCASTER, O.—Henry B. Peters has been appointed receiver of the Lancaster Street Railway, which has not been in operation for two years.

TOLEDO, O.—The Toledo & Maumee Valley Electric Railway Company will build a power house at Maumee, and will use water power from the Wabash & Erie canal.

URBANA, O.—Right of way for the electric road to Springfield is being secured by Col. Fred Colburn, of Charleston, W. Va.; J. G. Webb and H. H. Handford, of Springfield.

CLEVELAND, O.—The Scenic Railway Company has been incorporated with \$15,000 capital by J. B. Hanna, George G. Mulhern, E. W. Radder, John Erhardt, M. H. Solloway.

TIFFIN, O.—At sheriff's sale, Joseph Loudenslager, Jr., bought the Tiffin Street Railway for \$4,010; and Samuel B. Sneath bought the Tiffin Electric Street Railway for \$20,000.

LIMA, O.—The Lima & Wapakoneta Electric Railway Company is being organized by B. C. Fautot and Edmond & Metheany, Lima. The line will touch St. Marys, New Bremen and Piqua.

IRONTON, O.—R. T. McDonald, of New York, who owns the local electric lighting plant, has purchased for \$20,000 the Ironton & Petersburg Street Railway. The road will be changed to electric.

CINCINNATI, O.—J. H. Charles Smith is attorney for John T. Adams and Henry Bushman, and other eastern capitalists who contemplate building an electric railway through Mt. Airy, Groesbeck, Bevis and Venice.

XENIA, O.—The Springfield, Cedarville, Clifton & Jamestown Electric Railway Company has been granted a franchise through Clarke County. Work must be begun by July, 1896, and completed in six months.

YOUNGSTOWN, O.—Franchises for additional extensions to Poland and North Lima have been granted the Park & Falls Electric Railway Company. The line is to be 14 miles long and will carry the product of large coal mines and fruit farms.



Untoos there, will yer? The old mare's willin', but I'm blowed if I'm goin' to let her haul a street car for anybody."

CINCINNATI, O.—The Cincinnati Street Railway Company at its annual meeting re-elected its board of directors and increased its capital to \$11,000,000. The annual report showed a surplus of \$73,000 after paying all operating expenses and dividends.

CANTON, O.—A new company to build an electric line between Canton and Akron is being organized by William Hoover, New Berlin; Lew Smith, Greentown; Milo White, Springfield; W. H. Nees, Uniontown, and William A. Lynch, Canton.

AKRON, O.—His negotiations for the purchase of the Akron Street Railway having failed, John H. Drake, of Philadelphia, Pa., proposes to build new lines and extensions of the Akron & Cuyahoga Falls Rapid Transit Company, in which he is interested.

CINCINNATI, O.—The Martin Cable Street Railway Company, operating the Sycamore Street line, has, through its attorney, Alfred Hill, applied for permission to change its motive power to electricity. Permission has been withheld pending the settlement of the city's claim for \$10,000 against the company.

KINSMAN, O.—The North Trumbull Rapid Transit Company has been incorporated. Capital, \$10,000; incorporators James A. Russell, N. L. Perkins, E. M. Yeomans, R. B. Barnes, George E. Haine, R. T. Millikin, A. A. Raymond, Lemuel M. Dennison, D. T. Snyder, George W. Wilcox and Elias Sperry.

CINCINNATI, O.—The Cincinnati Electric Street Railway Company has been formed to purchase, and make an electric extension to, the Sycamore Street Cable Line, originally projected by Henry Martin and now owned by the third mortgage bondholders, for whom it was bought in at receiver's sale by David Sinton.

CHAGRIN FALLS, O.—The Geauga Central Rapid Transit Company is being organized to build the electric line to Knisman. A franchise has been asked by G. H. Ford, P. Morton, A. Fowler, W. S. Williams and P. W. Parmelee, of Burton; E. M. Yeomans, of New York; J. J. Rose and P. Thompson of Middlefield.

Pennsylvania.

UPLAND, PA.—The People's Electric Railway Company has applied for a franchise.

PROSPECT PARK, PA.—The Prospect Park Street Railway Company has been granted a franchise for an electric line.

PHILADELPHIA, PA.—The capital of the Philadelphia & Westchester Traction Company has been increased to \$400,000.

DUNMORE, PA.—P. J. Horan is president of the Dunmore Street Railway Company, incorporated with \$75,000 capital.

STROUDSBURG, PA.—Joseph M. Shull bought the Delaware Valley Electric Railway Company at receiver's sale for \$1,025.

CARLISLE, PA.—The Carlisle trolley road, which is unfinished, will be extended to Boiling Springs, Mechanicsburg and Harrisburg.

RANKIN, PA.—Albert L. Schultz, Pittsburg, is president of the Rankin Street Railway Company, incorporated with \$3,000 capital.

KANE, PA.—The Kane Street Railway Company has been incorporated to build an electric line. Capital, \$6,000; president, F. A. Lyte.

MEADVILLE, PA.—Franchises for a 45-mile electric line to Titusville and Conneaut Lake have been applied for by Massachusetts capitalists.

PITTSBURG, PA.—The Second Avenue Traction Company has purchased the McKeesport & Reynoldton Electric Railway for about \$370,000.

MEDIA, PA.—The Media, Middletown & Aston Electric Railway Company has been incorporated, with John B. Robinson as president, to build 15 miles of electric road.

CARBONDALE, PA.—It is said that J. W. Aitken, of Carbondale, is manager of the Carbondale & Forest City Passenger Railway Company which has just been granted a franchise.

PITTSBURG, PA.—The Munhall Street Railway Company has been incorporated with \$3,000 capital to build an electric road in Mitlin township. Albert L. Schultz is president.

PHILADELPHIA, PA.—The Grand Boulevard Street Railway Company has been incorporated to build from Pulaski avenue to Fisher's Lane. Capital, \$50,000; president, O. M. Thomson.

BRADDOCK, PA.—The Braddock Electric Railway Company has voted an assessment of \$50,000 on the capital stock, to build a bridge at Cope-land, and extend the line four miles to East Pittsburg and Wilkinsburg.

PITTSBURG, PA.—It is reported on good authority that the Westinghouse Electric & Manufacturing Company and the Baldwin Locomotive Works have affiliated for the purpose of developing apparatus for the operation of steam roads by electricity.

PITTSBURG, PA.—The Little Saw Mill Run Street Railway Company has been incorporated to build a 6-mile road to Castle Shannon. Capital, \$36,000; incorporators, J. M. P. Howley, Jonathan Barrett, Frank P. Howley, George W. Lewis and William Burchfield.

PHILADELPHIA, PA.—The Fairmount Park Transportation Company has given notice that it will begin construction. An ornamental steel bridge costing \$350,000 will be built by the company. Richard F. Bower, of the Philadelphia Traction Company, is president.

PITTSBURG, PA.—The Ft. Pitt Traction Company, which was granted right of way recently, has been incorporated to build to Bloomfield. Capital, \$500,000; incorporators, C. L. Magee, Joshua Rhodes, William B. Rhodes, Robert S. Frazer and William C. O'Reilly.

HARRISBURG, PA.—The control of the Cumberland Valley Traction Company has passed into the hands of local capitalists, George W. Cumber, B. F. Meyers, F. H. Alleman, W. K. Meyers and Luther Gorgas. The Carlisle trolley line will be pushed to completion.

PITTSBURG, PA.—The consolidated Traction Company has been incorporated with \$15,000 capital by C. L. Magee, George W. Elkins, George T. Whitney, William Flinn, George Sheppard. The company was organized to consolidate various lines of street railway in this city.

PITTSBURG, PA.—C. L. Magee writes that contracts for the ten miles of single track roadway of the Ft. Pitt Traction Company have been let, but contracts for power station and car equipment are not ready, as the engineers have not completed their plans. Forty cars will be operated.

PITTSBURG, PA.—Bernardo Paladini, formerly consular agent for the Italian government for Western Pennsylvania, and in the employ of the Westinghouse Electric Company, has resigned. He is on his way to Caracas, the capital of Venezuela, to construct electric street railways.

PHILADELPHIA, PA.—The Pennsylvania Traction Company has applied for charters for the Philadelphia, Lancaster & Harrisburg Railroad Company; capital, \$6,000,000; Lititz & Manheim Railroad Company, capital, \$50,000; and Lancaster, Ephrata & Reading R. R. Co., capital, \$70,000.

PITTSBURG, PA.—The West Side Belt Railroad Company has been incorporated with \$200,000 capital to build 70 miles of electric road connecting Monongahela City and the West End. James D. Callery is president and W. J. Burns, A. L. Schultz, E. S. Reilly, W. V. Callery, John S. Scully, G. W. Crawford, directors.

PHILADELPHIA, PA.—The Radnor Electric Passenger Railway Company has been incorporated to build $4\frac{1}{2}$ miles of line, capital, \$30,000; president, H. D. Hughes; secretary and treasurer, Andrew J. Reilly; directors, Albert L. Register, David Pepper, Jr., Frank E. Schermerhorn, Frank H. Hawkins, H. A. Mullen and Lincoln L. Eyre.

HOMESTEAD, PA.—The Homestead & Calhoun Park Street Railroad Company has been incorporated with \$18,000 capital, to build three miles of electric road to Calhoun Park. The officers are Matthew West, president, Joseph West, Thomas L. Brierly, George Gladden, James B. Neal, Robert M. Elliott, directors. All parties are in Homestead.

BEAVER FALLS, PA.—The Patterson Heights Street Railway Company has been incorporated to build an inclined electric railway, 3.5 of a mile in length. Capital, \$6,000; president, John Reeves, Beaver Falls; directors, Henry M. Meyers, John T. Reeves, Patterson Township. Harry W. Reeves, John Reeves and James F. Merriman, Beaver Falls.

JENKINTOWN, PA.—The Jenkintown & Fox Chase Electric Railway Company has been incorporated with \$20,000 capital, to run from York street in Jenkintown to Rhawn street, Fox Chase, Thirty-fifth ward, Philadelphia, by Howard Fleck, Samuel L. Schively, James Satterthwaite, Thomas B. Payen, Howard Noble, Jenkintown; William P. Longstreth, Fox Chase.

PHILADELPHIA, PA.—The Union Traction Company has been incorporated with \$30,000,000 capital, by John Lawler Welsh, Caleb S. Fox, William S. Sheldermine, P. A. B. Widener, William L. Elkins, Thomas Dolan, Joseph B. Altemus, James McManes, Jeremiah J. Sullivan, Alfred Smith, Alexander M. Fox. This is the company which will consolidate the electric systems.

PITTSBURG, PA.—The Pittsburg, Sheraden & Carnegie Traction Company has been incorporated to build an electric line from Alleghany to Washington, Pa., by way of the Chartiers Valley. Capital \$42,000; incorporators, Harding Kimberland, of Sheraden, president, and Henry Wenke, Miller Elliott, Richard B. Scandrett of Pittsburg, and D. H. Ferrell of Sheraden, directors.

GETTYSBURG, PA.—The Gettysburg, Baltimore & Washington Railroad Company has been incorporated with \$750,000 capital, to run 13 miles, from Cemetery Hill to Biddle's Mills, near the Maryland state line with a branch connecting with the Round Top extension of the Gettysburg & Harrisburg near Little Round Top. E. M. Hoffer, Hummelstown, is president and C. R. Ertter, Adam Ertter, W. T. Ziegler, C. A. Trostel, Penrose Meyers, W. H. Tipton, all of Gettysburg, directors.

Rhode Island.

PROVIDENCE, R. I.—The old car barn of the Providence Cable Tram way Company, at Olneyville, was burned, causing \$40,000 loss.

Tennessee.

CHATTANOOGA, TENN.—The Chattanooga Electric Street Railway Company will probably extend its line 1½ miles to Rossville.

KNOXVILLE, TENN.—Receiver J. C. Duncan has sold the Knoxville Electric Street Railway for \$162,157 to J. Stimpson, Africa, representing a reorganization committee of the majority bondholders.

KNOXVILLE, TENN.—Col. C. C. Howell, representing the bondholders' reorganization committee, says that if the recent sale is confirmed, \$100,000 will be expended for new track and new rolling stock.

Texas.

HOUSTON, TEX.—John H. Kirby has been appointed receiver of the Houston City Street Railroad Company.

HILLSBORO, TEX.—Mr. Graham, president of an implement company in Boston is negotiating for an electric road here.

DANVILLE, TEX.—N. W. Berkley, superintendent of the Danville Street Car Company, is in the north arranging for an immediate increase in power plant.

MEXIA, TEX.—Charles R. Pengilly is promoting a company to build six miles of electric road to Tehuacana. Major H. A. Boyd, M. Yoakum, Robert Smith, J. W. Pearson and Dr. H. A. Johnson, Tehuacana, are soliciting subscriptions.

Virginia.

MANCHESTER, VA.—John C. Robertson has applied for a franchise for an electric road to Petersburg.

PETERSBURG, VA.—Supply men who have claims against the Petersburg Street Railway Company and the Petersburg & Asylum Railway Company for material furnished before the receiver was appointed, will have to wait for settlement of accounts until there is a net income from operation, Judge Mullen holding that there was no evidence of a diversion of funds.

Washington.

SEATTLE, WASH.—Frank H. Osgood, of the Seattle National bank bought the Ranier Avenue Electric Railway for \$14,300. The road is 8 miles long.

TACOMA, WASH.—Creditors of the Tacoma Railway & Motor Company are requested, by Receivers S. Z. Mitchell and George W. Bird, to present their claims on or before September 1 with vouchers.

SEATTLE, WASH.—The Seattle Consolidated Street Railway Company has been granted a 50-years' franchise. N. W. Harris & Co., New York and Chicago, can give information in regard to construction.

SEATTLE, WASH.—The Seattle & Rainier Beach Railway Company has been incorporated with \$20,000 capital by Herman Chapin, E. W. Andrews, Josiah Collins. This company has bought the old Rainier line, which will be improved.

West Virginia.

CHARLESTON, W. VA.—A New York syndicate has bought the street car line, water works and electric light plant.

Wisconsin.

STEVENS POINT, WIS.—The Stevens Point Lighting Company, Water Company, and Electric Railroad Company have been consolidated.

MILWAUKEE, WIS.—The Milwaukee General Railway Company, of which Lawrence McGann, of the Chicago General Street Railway Company, is promoter, has applied for a franchise.

MILWAUKEE, WIS.—The Milwaukee Street Railway Company has been granted a franchise by the Town of Lake, which will enable it to reach the suburbs, St. Francis, Cudahy and South Milwaukee.

SHEBOYGAN, WIS.—The Sheboygan Light & Power & Street Railway Company has elected George B. Mattoon, president, J. M. Saemann, vice-president; F. L. Saemann, treasurer; E. L. DeBell, secretary.

MILWAUKEE, WIS.—Peter J. Somers, of Milwaukee, and Congressman Lawrence McGann, of Chicago, are at the head of a new company which will apply for a franchise to build 18 miles of electric railway.

OSHKOSH, WIS.—The Oshkosh Street Railway Company has appointed G. L. Madison, Charles Barber and J. H. Porter, a committee to ascertain the cost and feasibility of substituting electricity for animal power.

MILWAUKEE, WIS.—At a recent meeting of J. W. Bingham, Jacob Wellauer, Charles Pittelkow, Max Rosenthal, A. B. Myers and James Petley, directors of the Waukesha-Milwaukee Electric Railway Company, it was decided to set graders at work, and push the construction work.

MILWAUKEE, WIS.—The Milwaukee General Railway Company has been incorporated with \$1,000,000 capital by F. Boden, William Kurth, C. H. Muller, Peter J. Somers. This is the company projected by Lawrence McGann, president of the Chicago General Street Railway Company.

MILWAUKEE, WIS.—Henry C. Payne has made a formal proposal for the Milwaukee Street Railway Company to build a line to South Milwaukee. Lawrence McGann, president of the Chicago General Street Railway Company has made a proposition to the South Milwaukee Advancement Association to build a line to North Milwaukee and Whitefish Bay.

THE KILPATRICKS.

All of our readers have no doubt heard of Charles G. Kilpatrick, the one legged trick bicycle rider, and will be interested in learning that he intends in the future to give special attention to the wants of street railway pleasure resorts. He proves a drawing card wherever he appears. He is about to fill an engagement at the "Electric Park," a street railway resort in the northwest part of Chicago. The most sensational act performed by Mr. Kilpatrick is a repetition as near as local conditions will allow of his ride down the Capitol steps at Washington, at the rate of eighty steps in three seconds. This feat is performed when the company erects a suitable flight of steps for the purpose. In addition to this, Mr. Kilpatrick and his wife give an attractive program of trick riding. He will no doubt do a large business with street railway resorts.



NEW PUBLICATIONS.

The Charles Scott Spring Company has issued a very nice catalog of its extensive line of goods, which every repair shop ought to have on hand.

Cassier's Magazine for July is a "Niagara power number," and contains a fine description of the work that has been done to develop that magnificent water power and transmit it electrically.

The report of the Dublin United Tramways Company for the first half of 1895, has been sent us by R. S. Tresilian, assistant secretary. It is a model in its way, as is usual with all documents compiled by Mr. Tresilian.

Engineering Contracts and Specifications, is the title of a useful book which is about to be published by the Engineering News Company, Tribune Building, New York. It is of value for reference, both by those letting and those taking contracts.

The descriptive advertising matter illustrating Ideal engines, which is being sent out by A. L. Ide & Son, Springfield, Ill., is very handsome and attractive matter. It will interest not only the several hundred users of Ide engines, but all in need of high speed engines.

Lippincott's for August has an unusually entertaining and novel selection of stories besides very interesting articles on subjects which interest all. Among the latter may be mentioned the "Passing of the Cowpuncher," the "Bicycling Era," and the "Pleasures of Bad Taste."

The University of Wisconsin publishes this year, as a Bulletin, an extensive thesis by Leonard Sewal Smith, instructor in engineering, on "An Experimental Study of Field Methods Which Will Insure to Stadia Measurements, Greatly Increased Accuracy." It will prove useful to those engaged in civil engineering.

The Electrical Engineering Leaflets series which has been running in the Electrical Engineer for some time past has been completed, and has been put in book form by its publishers. It is divided into three volumes. The elementary is for those who are entirely new to the subject, the intermediate for workers who have already a fair practical

knowledge, and the advanced for those who have had a higher education before beginning the work. In view of the experience of Professor Houston as an educator as well as a practical electrical engineer, the series will no doubt prove very popular as text books.

"Facts" and "Steam" are two new primers issued by the Babcock & Wilcox Company of New York and London. "Facts" illustrates and briefly describes 55 different styles of boiler dating from 1805 to the present time. This booklet is entertaining as well as instructive, wit being judiciously mixed with wisdom. Its companion volume, "Steam," treats of the Babcock & Wilcox and other modern boilers, and gives many handsome illustrations of the Babcock & Wilcox works.

CAR HEATING.

Coal vs. Electricity.

As long as the open cars are merrily bowling along filled to the boards with pleasure seekers, in which the summer girl forms a pretty picture, it seems hard to entertain the question of such frigid subjects as car stoves, heaters and snow plows. At the same time the prudent manager, like the sagacious merchant is he, who in midsummer provides for his Christmas trade. That the electric heater with its freedom from ashes and box of fuel, and stowed away beneath the seats, possesses many ideal features not claimed by its foster parent, the car stove, is undoubtedly true. At the same time, with most roads the selection of a heating apparatus must be based on the more prosaic facts of dollars and cents.

It will be of interest therefore to study the figures compiled last winter by M. K. Bowen, superintendent of the Chicago City Railway, and which have resulted in adopting a coal stove as standard, further mention of which is made below.

In Mr. Bowen's tests, and last winter was a severe one in Chicago, 76 motor cars were equipped with the Columbia heater, of magazine or self feeding pattern, burning anthracite coal; and 10 motor cars with two types of electric heaters. Cars were 21 feet long; no vestibules; and both back and front doors were frequently opened in actual service. Tests were made for heating cars to 35° F. above outside temperature. Following table concisely summarizes the tests:

Hard coal delivered to barns cost \$5.35 per ton. Stove consumed 1 $\frac{3}{4}$ pounds per hour.

Coal delivered at power station at \$1.40 per ton.

Electric heaters consumed 6.2 amperes.

	ELECTRIC HEATERS	HARD COAL STOVE
Estimated interest at 6 per cent electric heaters at \$50. and stoves at \$25.	.0082	.0041
Estimated depreciation 10 per cent electric heaters and 20 per cent stoves.	.0137	.0137
Repairs and care	.0020	.0067
Cost power or fuel consumption	.9360	.0803
Total cost per car per day of 18 hours	.9599	.1045

The Columbia heater referred to and which has now been adopted is manufactured by the McGuire Manufacturing Company, of Chicago, which reports its adoption on 125 other roads, with whom the average cost of daily operation last winter was only 8.3 cents. The heater is neat and compact in form, and heavily nickeled, making an attractive addition to a car; while, as some one has said, the same amount of heat in a "visible form" goes a long ways in convincing some people that they are actually enjoying the comfort the thermometer states.

PICTORIAL EVENTS OF A MONTH.

Cars were held up at Wichita, Kan., Springfield, O., and Erie, Pa., but nothing was secured by the robbers.

Philadelphia's three largest street railway systems have been consolidated as the Union Traction Company with \$30,000,000 capital. Details of the organization are given elsewhere.

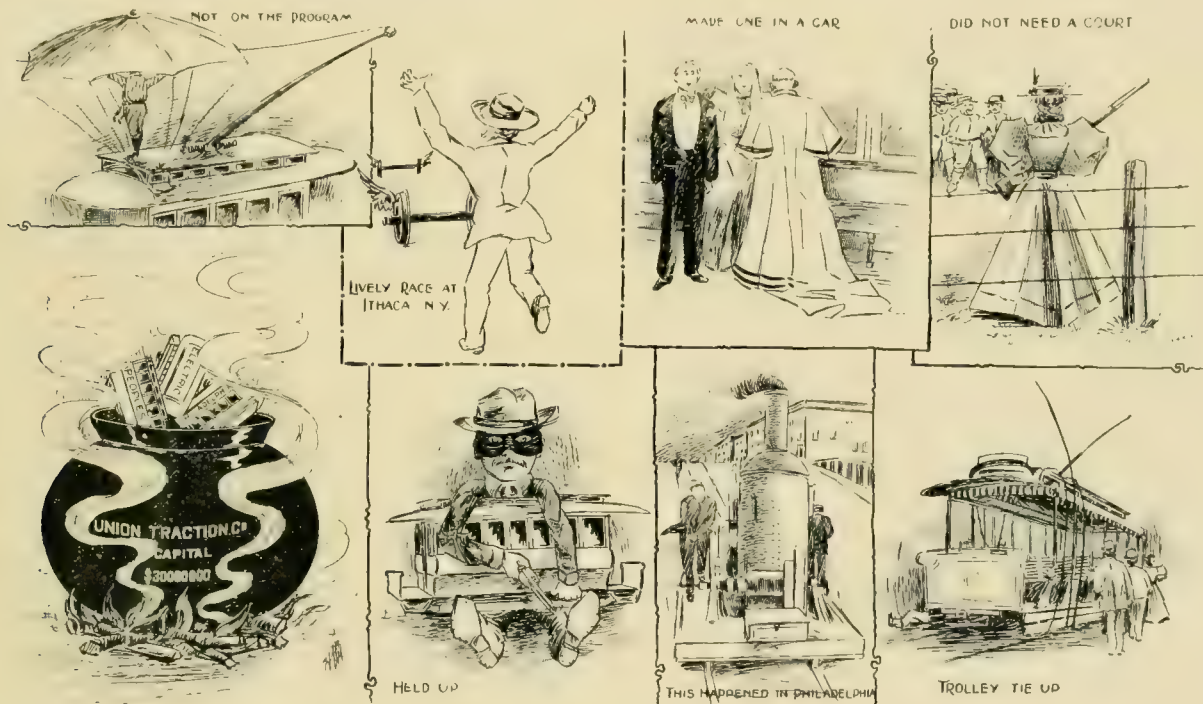
The conduits of the Columbia Avenue cable line, Philadelphia, are being removed, as the line has been changed to electric. An engine loaded on a flat car is used to hoist the iron. About 3 a. m. the engine got away, sped down a declivity, ran off the track and broke a section out of a granite curb before it stopped its downward career.

A trolley wire snapped in Chattanooga, and brought a

has been found; children have been born, people have died, and now comes a marriage in a street car. It only remains for a funeral service to be held in a funeral car to celebrate the various stages of man's existence.

In attempting to trundle two pairs of wheels in Ithaca, N. Y., two workmen found that they had a difficult job. It was easy enough on level track, but a slight change of grade gave an impetus to the wheels, which soon left their guardians in the rear. An accident was narrowly averted. A car was approaching on the same track, but the motorman noticing the rapidly approaching wheels reversed the current, backed his car and kept out of the way. After the wheels caught up with the car, he shut off the current, which of course stopped the car, and the runaways. The passengers had much amusement.

Prof. Fink, an aeronaut, made a balloon ascension at a



car to a stop, after encircling it three times. The passengers were so badly shaken up that they did not notice the grace with which the motorman turned a summersault over the dash. No one was injured. A similar accident happened in Indianapolis.

Rather an odd case happened in New Jersey. A company bought a tract to lay out as a summer resort. One morning workmen discovered a portion of it fenced in by a wire fence, which was guarded by a woman with a shotgun. She had a lease on the property which had been sold, and didn't propose to have her crops taken without compensation.

Lorenzo Lyons and Delilah Smith, Kansas City, were married in a street car at 11 p. m. not long ago. They wanted a romantic wedding, so they got a justice to tie the knot in this unusual place. Thus the connecting link

street railway resort. The people gazed open-mouthed at his wonderful ascent, and thought it was fine when he took to the parachute. As he gracefully descended the crowd rushed to see him alight, which he did, but not as he intended. In spite of all he could do he was compelled to step on a trolley wire, and easily jumped to the ground. The parachute caught and could not be dislodged until a car came along. The professor got on the roof, disengaged the parachute, and finished his interrupted journey to the ground as any aeronaut would have done.

The Brattleboro, Vt., Street Railway Company opened its completed line from Prospect Hill to West Brattleboro, amid the booming of cannon and the rejoicing of the people. M. A. Coolidge, Fitchburg, Mass., was the contractor.



The St. Louis Car Company, of St. Louis, Mo., is building 20 convertible cars for the Pleasant Valley Traction Company, Pittsburg, Pa.

The John Stephenson Company, of New York, has shipped several open cars to the Jacksonville Street Railway Company, Jacksonville, Fla.

Pepper & Register, Philadelphia, are constructing the overhead work for the Frederick road branch of the City & Suburban Railway Company, Baltimore.

The Laconia Car Company, of Laconia, N. H., has received from the West End Street Railway Company an order for 40 closed cars for October delivery.

The American Electrical Works, of Providence, R. I., will celebrate the 25th anniversary of their establishment, on August 17, with a clam bake at Haute Rieve.

The Lane & Bodley Company, of Cincinnati, O., has issued a handsomely illustrated 74-page catalog describing the Columbian corliss engine and giving names of 300 users.

The R. A. Crawford Manufacturing Company, of Philadelphia, Pa., has been given the contract to place its fender on the cars of the Brooklyn Heights Railroad Company, Brooklyn, N. Y.

The Shultz Belting Company of St. Louis, Mo., is having a good demand for its product. The exports are increasing, the company having recently shipped 5,000 feet of its belting to Sweden.

The Clayton Air Compressor Works, Brooklyn, N. Y., have issued a complete catalog embellished with illustrations of compressors, street cars, locomotives and many novel compressed air appliances.

The Charles Scott Spring Company of Philadelphia, Pa., has issued a catalog of elliptical, coil, and other car springs for trolleys and sash, as well as trucks. Views are given also of the company's works.

The Wells & French Company, is building 80 cars for the North Chicago Company, 40 motor cars and 40 trail cars; also 4 cars for the Ft. Madison Street Railway Company, Ft. Madison Ia., and 4 for Pontiac, Mich.

Charles A. Schieren & Co., of New York, have just sold to the Southern Electric Light & Power Company, Philadelphia, four 3-ply leather belts 64 inches wide, 3 of them to be each 162 feet long, an aggregate of 580 feet.

Frank Randall, who so effectually looks after the interests of the J. G. Brill Company as western selling agent, has just closed an order with the West Chicago Street Railroad for 12 large sweepers of latest improved type.

The Fuel Economizer Company, of Mattewan, N. Y., has sold recently, through its western office, 1540 Marquette Building, Chicago, 2,500-horse power of economizers to the Tuttle Manufacturing & Supply Company, Anaconda, Mont.

The Dorner & Dutton Manufacturing Company, of Cleveland, O., will enlarge its shops so as not to get behind on orders for trucks, carwheels, gears and pinions. Since June 1, the works have been running nights, with a full force of men.

The Peckham Motor Truck and Wheel Company at its recent annual meeting in Kingston, N. Y., elected as directors, Edgar Peckham, president and treasurer; H. C. Soop, vice-president; J. H. Burton, secretary; Charles Bray and W. H. Wilkinson.

Among the American supplies adopted by the Dublin, Ireland, tramway now under construction, are Peckham's trucks, Standard air brake, Chicago rail bond, and General Electric 800 motor and K controllers, and Morris, Tasker & Co.'s tubular steel poles.

The Metropolitan Electric Company, Chicago, carries in stock a large supply of ship cored carbons imported direct from Vienna, Austria. Abram DeRonde & Co., New York, are the selling agents for the United States. A full line of the McAllan line material is carried.

In renewing his subscription, Charles F. Shaw, treasurer of the Union Street Railway of New Bedford, says: "Your publication is full of interest, the printing and paper excellent, and the cuts fine. I enclose you check for \$4, for two years subscription, to be sent to me as treasurer."

The Triumph Electric Company, of Cincinnati, O., has established a branch office with Turner Bros., 25 Marietta street, Atlanta, Ga. E. F. Seixas, formerly with J. Holt Gates, Chicago, has charge of the new office and also of the company's exhibit at the Cotton States Exposition.

The Harrisburg Foundry & Machine Company, Harrisburg, Pa., has issued a finely illustrated booklet, thoroughly in keeping with the subject it treats, namely, the luxuriously appointed power plant of Keith's elegant new theater at Boston, which is equipped with the Harrisburg "Ideal" engine throughout.

Alex. H. Lewis, formerly with the Abendroth & Root Manufacturing Company, New York and Cincinnati, has gone with H. E. Collins & Co., sole sales agents for the Cahall vertical water tube safety boiler. He has opened an office

at 71 Perin Building, Cincinnati. Mr. Lewis is one of the oldest boiler men in the business, and has already captured several good orders.

"Dixon's graphite pipe-joint compound," is a new and better name for the article formerly known as "pipe-joint grease," and which is becoming so popular with intelligent mechanics as a superior substitute for white or red lead on screws and bolts, gaskets and flange joints. This compound is manufactured by the Joseph Dixon Crucible Company, of Jersey City, N. J.

In our description last month of the Nantasket Beach division of the New York, New Haven & Hartford railroad, we omitted to state that fare registers are used, the same as on all other well equipped electric lines. The make selected and installed was the New Haven register which was chosen after a spirited competition. That they are giving satisfaction it is unnecessary to state.

The Sheffield Car Company, of Three Rivers, Mich., manufacturer of inspection and hand cars for track repairers, has issued a foreign catalog, handsomely illustrated with full page engravings of its leading styles of light cars. Persons in foreign countries interested in light cars of any description will be mailed a copy on application; it is printed in English, French, German and Spanish.

The Hawley Down Draft Furnace Company, of Chicago, in its new illustrated catalog guarantees that its smokeless furnaces will consume 95 per cent of the smoke, burning any quality of soft coal at the rate of 20 to 45 pounds per hour per square foot grate surface. The Hawley furnace is said to increase the capacity of boilers $\frac{1}{3}$ to $\frac{3}{4}$ above rating and to give a uniform heat under all parts.

H. E. Collins & Co., Pittsburg, sole sale agents for the Cahall vertical water tube boilers have appointed the following agents: John R. Bitner, 24 South Water street, Cleveland; Alex. H. Lewis, 71 Perin building, Cincinnati; Lewis Metesser, New Orleans. These gentlemen have all been connected with the boiler business in different fields and are capable, earnest and energetic men, who give great promise of extending the field of the Cahall boilers beyond the original expectations of either the manufacturers or original promoters.

The Abendroth & Root Manufacturing Company, 28 Cliff street, New York, manufacturer of the improved Root water tube boiler, has been awarded the 626-horse-power boiler contract from the Union Car Company of Buffalo, N. Y., and a 500-horse-power contract from the Reading Steam Heat & Power Company of Reading, Pa. The company is also erecting in New York city 300-horse-power in the College of Physicians and Surgeons; 2 boilers in the Baptist Home; 1 boiler in the Parmlly Building and 2 boilers for the Sing Sing Electric Lighting Company.

John A. Beeler, Denver, writes that the Denver Consolidated Tramway Company will construct new city terminals, track work to begin at once. A double loop will be built on block 74, bounded by Lawrence, Arapahoe, Fourteenth and Fifteenth streets. The alley running through the block will be widened to a 66-foot street, which will be known as Tramway place, into which the cars from Fifteenth street will turn, making transfer of passengers in a beautiful ornamental depot. The company is preparing plans for two large stores and an office building to be built upon the property.

The Stever Rail Joint Company has opened a new office at 508-509 Garfield building, Cleveland, O. The Stever joint has recently been applied on the Georgetown & Tenallytown Railway, Washington, D. C.; Utica Belt Line Street Railroad, Utica, N. Y.; Pass & Belt Railway, Lexington, Ky.; Louisville City Railway, Louisville, Ky.; Buffalo, N. Y. Railway, and Wheeling, W. Va., Railway. Visitors to the Montreal convention will have an opportunity to examine the Stever joint in operation, as it has been applied on both the Montreal Street Railway and the Montreal Park & Island Railway.

The Jackson & Sharp Company, of Wilmington, Del., is building several different styles of car for various street railways. Among them are interurban cars for the Mt. Holly branch of the Pennsylvania Railroad, and the Akron, Cleveland & Bedford Electric Railway. Those for the latter road are 35 feet in length, mounted on Dornier & Dutton trucks, equipped with Westinghouse 50-horse-power motors. For the Atlantic Avenue Railroad four double truck excursion cars are under construction, and for the Gloucester, Essex & Beverly Railroad, six fine vestibuled cars with mahogany finish and Peckham trucks.

The Central Electric Company, Chicago, is putting on the market a novel device for cars, a 2-circuit switch which controls the headlights and interior lights from one common center. As a preventive of the numerous burn-outs formerly experienced, it is proving highly satisfactory to users. The company is shipping large quantities of the Billings & Spencer drop-forged commutator bars and sales are constantly on the increase, as is the rule with the other materials sent out, its excellence generally eliciting a second order. Railway men appreciate the fact that the Central Electric Company is in a position to furnish them a complete line of construction material, tools, station instruments, etc.

The Detroit Steel Spring Company, Detroit, is erecting a new all steel addition, 75 feet by 100 feet, to its spring department. The company is installing two new boilers under which, as well as under the old boilers, are being placed stokers of the American Stoker Company, Dayton, Ohio. Coal conveyors are also being put in. A new 18-inch mill has been ordered from the Totten &

Hogg Iron & Steel Foundry Company, and a new 12-inch mill is being added to the spring department. The Edward P. Allis Company, Milwaukee, is building a corliss engine to run the 18-inch mill. These additions to the plant were made necessary by the increase of the business of the company nearly 100 per cent.

The McGuire Manufacturing Company of Chicago, is more crowded than ever, and reports the following late orders for its electric trucks: Norfolk City Railroad, Norfolk, Va.; White Line Street Railway, Dayton, Ohio; Dighton, Somerset & Swansea Railway, Taunton, Mass.; Derby Street Railway, Derby, Conn.; Toledo & Maumee Valley Railway Toledo, Ohio; Milwaukee Street Railway, Milwaukee, Wis.; Jefferson Avenue Railway, St. Louis, Mo.; Metropolitan Street Railway, Kansas City, Mo.; Youngstown Street Railway, Youngstown, Ohio; Lake Street Elevated Railway, Chicago. The company is specially to be congratulated upon securing the order for the trucks for the Lake Street Elevated Railway.

The Edison-Brown plastic rail bond has been adopted as the standard by the Consolidated Traction Company of Newark, N. J., after long tests. This company is also putting down buried track feeders composed of old rails bonded with the plastic bond. The Suburban Traction Company of Orange has recently taken up 185 joints of the plastic alloy in replacing old rail which was in service four years. We are informed there was no sign of rust or failure. The Buffalo Railway has adopted the plastic bond and is also using old rails as track feeders. They are enclosed in a wooden box and the extra space is filled with a semi-liquid insulation derived from petroleum distillation refuse. On the Niagara Falls & Lewiston Railway one gang of men applies bonds and puts on angle bars at the rate of a mile a day.

The Ohio Brass Company's new catalog, No. 3, recently issued, has evidently met with the approval of the trade. Although it was but lately distributed the results are already plainly felt in the way of increased orders. The company reports business in a very satisfactory condition, as it has recently secured the following large contracts, besides numerous smaller ones: Benwood & Moundsville Electric Railway, Benwood, Va.; Austin Dam & Suburban Railway, Austin, Tex.; Cincinnati Street Railway, Cincinnati, O.; Brunswick Traction Company, New Brunswick, N. J.; Union Railway, New York; Tonawanda Street Railway, North Tonawanda, N. Y.; Lemuel Serrell, contractor, New York; Ogdensburg Street Railway, Ogdensburg, N. Y.; Mahoning Valley Railway, Youngstown, O.; London Street Railway, London, Can.; and Interurban Railway, Saginaw, Mich.

The Fitzgerald-Van Dorn Company, of Chicago, has received orders to furnish automatic car couplers to Montreal, Can.; Springfield, Mass.; Homestead & Highlands Street Railway, Pittsburg, Pa.; Joliet and Kankakee, Ill., and Albany, Auburn, Middletown and Newburgh, N. Y.

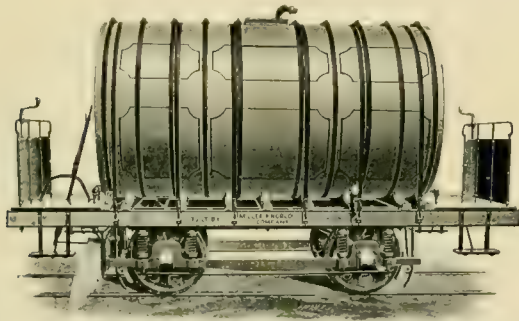
The company has also received a contract for equipping the cars of the Lake Street Elevated with its draw bars. A new bar has just been brought out for interurban roads where fast time is required. It couples to within 3-32 of an inch, so that there is practically no lost motion either on a stop or a start. "This new drawbar," says Mr. VanDorn, "makes a train the same as one car, as there is no buffing on the platforms, all strain being on the draw-bars. There are a great many cheap bars being put in cars now days, which will not do the work required by fast speed. The roads which are in their infancy are bound to be extended, and the increasing traffic will compel the hauling of trail cars. Managers should understand that it will not cost them any more, if they specify a first class drawbar in their new cars, instead of permitting the use of cheap cast iron bars that will not last under the strains of the severe tests of interurban lines."

H. E. Collins & Co., sole agents for the Cahall vertical water tube boiler, manufactured by the Aultman & Taylor Machinery Company, of Mansfield, Ohio, report the following recent sales of Cahall boilers: Philadelphia Company, (third order) 250-horse-power; Cornwall, Pa., Iron Company, 500-horse-power; Wellsville, O., Plate & Sheet Iron Company, 500-horse-power; Apollo Iron & Steel Company, Pittsburg, (third order) 7,000-horse-power; Union Iron and Steel Company, Youngstown, O., 300-horse-power; Union Rolling Mill Company, Cleveland, O., 150-horse-power; Andrews & Hitchcock Iron Company, Youngstown, Ohio, for Hubbard furnaces, 250-horse-power; Logan Iron & Steel Company, Lewistown, Pa., 150-horse-power; Siemens & Halske Electric Company, Grant Locomotive Works, Chicago, 250-horse-power; Ashton Plantation Company, Luling, La., 750-horse-power. The boilers for the Cornwall Iron Company and the Andrews & Hitchcock Iron Company are for blast furnace gases. Those for the Union Iron & Steel Company and the Union Rolling Mill Company are all for the utilization of waste heats from heating furnaces. Those for the Philadelphia Company and the Apollo Iron & Steel Company are for natural gas firing. Those for Wellsville Plate & Sheet Iron Company, the Siemens & Halske Company, and Logan Iron & Steel Company, are for direct firing with bituminous coal. H. E. Collins & Co. report that they have been under great pressure to complete the orders received, but are now relieved some by the additions to their plant now practically in operation, and which when finished will be capable of turning out 1,000-horse-power per day.

J. E. Defebaugh, editor and publisher of the *Timberman*, Chicago, celebrated the 9th anniversary of the publication of his journal with a handsome edition of 176 pages. It is without doubt the best and largest issue of a lumber paper published. It is filled with illustrations and contains many articles on the various branches of the lumber trade. Mr. Defebaugh had a hard struggle in the early life of his publication, but by perseverance has worked up a prosperous business which is increasing.

A PRACTICAL TRACK SPRINKLER.

As street cars, especially on electric lines are moved faster than formerly, resulting in the raising of much dust, that is not only annoying to the passengers, but which hastens the wearing of journals and axles and motors, the sprinkling of the street between and adjacent to the rails, is becoming a necessity. There are lines on which the dust in dry weather is almost intolerable. The use of tank sprinklers on these tracks abated the dust



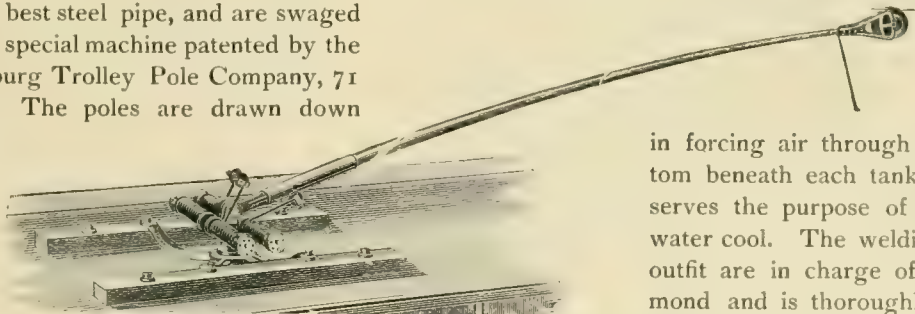
nuisance, which is not only appreciated by the passengers, but results in a saving of the machinery.

There is no longer any doubt that a sprinkler is the best investment a manager can make. As between attempting to build one at home or purchasing direct, the course of wisdom would seem to be that a concern with all the facilities for this special work and building such equipment every day can build better and for the same class of materials sell cheaper than the same can possibly be built at home; and the lasting qualities are greatly in favor of the scientifically built sprinkler, which will do its work for years without breaking down and getting out of fix.

The Miller-Knoblock Track Sprinkler which is manufactured at South Bend, Ind., is illustrated herewith. It is a pronounced success and has been in use in Cleveland, Detroit, Brooklyn, Newark and other cities where it has given splendid satisfaction.

NEW TROLLEY POLE.

Many special features are claimed by the manufacturers for the type of trolley poles shown in this connection. They are made from the best steel pipe, and are swaged to the proper shape by a special machine patented by the manufacturers, the Pittsburg Trolley Pole Company, 71 Water street, Pittsburg. The poles are drawn down to proper size at one heat, thus insuring a uniform taper and perfectly smooth surface. They are made of any size or length, and are said to be very light, at the same time being of great strength. A large stock is carried so that all orders can be promptly filled. The officers of the company are R. S. Robb, president; S. R. Wilson, treasurer; G. R. Proctor, secretary.



CONSTRUCTION WORK IN DETROIT.

From one of the poorest equipped street railway cities in the country to one of the very best is the transformation now being worked in Detroit. The delay, however, has brought with it the advantage of profiting by the mistakes and successes of all the other cities. Work is being actively pushed although somewhat retarded by delay in obtaining material owing to works being crowded and behind on orders.

The Detroit Citizens still have a large amount of track to relay and the installation at the power house is far from complete. It will be nearly a year before they will be fairly through and settled down.

The track work is undoubtedly the heaviest in this country, being 7-inch girder laid in concrete, without ties, and electrically welded. The Johnson Company has a new and very complete three-car outfit at work on this process. The first car which is a flat, carries two one-horse-power motors, each driving an emery wheel; current being taken from the trolley wire by a fish pole, making a side contract so as not to interfere with the running trolley of passenger cars, which are kept in regular operation on a temporary track which is laid at the side of the street. Light T rails laid on exposed wooden ties are used but permits of high speed, approaching 20 miles an hour on other than business streets. The first car crew prepare the rails for welding, and is followed at a short distance by the second, which is called the compressor car and carries an hydraulic pump, working the compressor clamps operated by a heavy cylinder four feet long and 20 inches diameter. Ninety tons pressure is ordinarily the maximum employed although the machine has a rated capacity of 200 tons. This car is a self propeller, having two 25-horse-power motors, and travels on the completed track. The third car is the welder, a massive box carried on 4-wheel trucks weighs 32 tons. At one end is the 250-horse-power motor; at the other end the hoister and crane. The contact points are kept from unduly heating by a constant stream of cold water pumped by a one-horse-power motor, and drawn from four tanks; two under and two within the car. A large fan motor also is employed

in forcing air through the air bottom beneath each tank, and which serves the purpose of keeping the water cool. The welding crew and outfit are in charge of J. G. Raymond and is thoroughly organized and equipped under favorable conditions four welds per hour are accomplished. When the welder has passed, the paving crew follow, using a high grade brick, and leaving the street in unusually smooth and fine condition. Our impression from riding

over some of this new track is that it is very substantial and outside of the joints should be very enduring. Whether the joints will pound remains to be seen. The concrete bed also lacks that spring which is present in riding in a car over wood ties, and the passenger in riding in an open car instantly notices the change from the old to the new track, which being unyielding causes more rumble. Our belief is when the box cars are put on it will be found necessary to put rubber cushions between box sills and truck sills in order to deaden the noise which even now is unpleasant; probably more so to passengers than to persons on the street. Of course this concrete bed track has been the standard in England for many years, but they have been operating light cars, at the slow speed incident to animal locomotion.

The Detroit Railway, the Everett road, which was inaugurated so auspiciously July 8, is already enjoying a large traffic. Their power house is still unfinished but is rapidly approaching completion. Their brick stack, 210 feet high, is a conspicuous landmark to travelers up and down the Detroit river, and has the company's name in white brick.

Barn No. 1, of the Detroit Railway, is both unique in its construction and convenient in arrangement. It is 80 feet wide by 430 feet deep, and designed to house about 75 cars. The roof is supported by heavy steel arches made by the Russell Wheel and Foundry Company. These arches also carry the second-story floor, thus leaving the ground floor entirely free from posts, an advantage readily appreciated. The ground floor is concrete in the wash room, which adjoins the inspection room. Pits for examination are two in number, each 100 feet in length. The machine shop is 80 by 120 feet, excavated five feet below grade with concrete floors, permitting workmen to walk upright when beneath the cars. Steel arches support the roof and shafting.

In the car house the tracks are laid to a grade of 4 inches in 100 feet, or 18 inches fall from rear to front. This will greatly facilitate exit in case of fire and is along the lines urged in these columns two years ago.

The second story extends for 100 feet from the front, and contains offices, lockers for the men, and commodious bath rooms to which employes have free access.

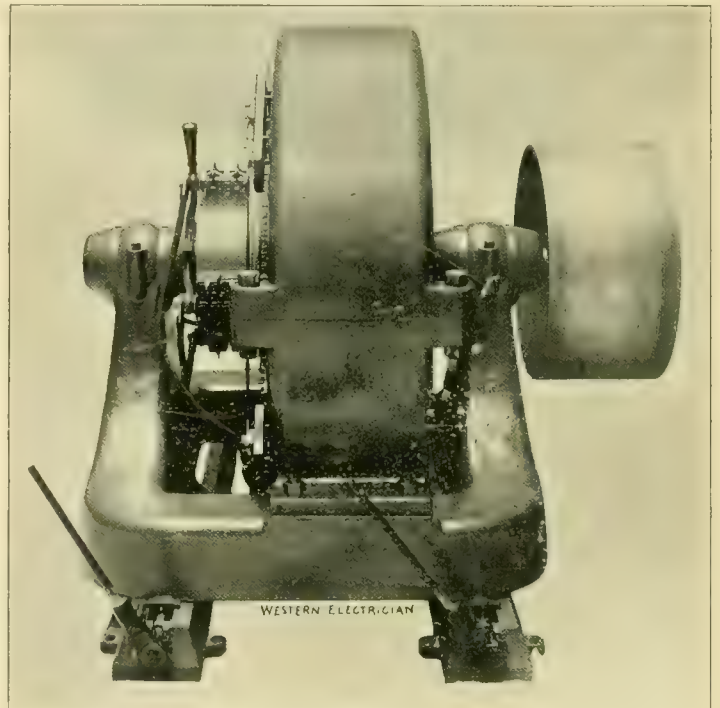
The company has 30 miles of track completed, 20 miles of which is in operation, and earnings have far exceeded expectations. H. A. Everett says: "We are earning over \$20 per day per car except on Saturdays and Sundays, on which days we are earning \$30 per car. Seventy-five per cent of our income is in the 8 for a quarter tickets. Our power house is coming on as rapidly as could be expected and we will have "juice" within the next three weeks from our own power house, from direct connected Allis engines and Walker generators."

VIENNA ADOPTS ELECTRICITY.

The municipality of Vienna, Austria, is calling for bids before November 14, for plans, construction and operation of a complete system of electric railways.

NEW RAILWAY GENERATOR.

The latest railway generator is of the slow speed four-pole type made exceptionally heavy in the wearing parts to insure durability and to stand the severe strains of street railway work. The fields are of soft cast steel and all parts of the magnetic circuit are so proportioned that exciting current, says the manufacturer, is very small and hence the efficiency high. The armature is of the smooth core Gramme type. The windings are said to be so proportioned that there is no change of lead and the machine runs absolutely sparkless even though the full



load be thrown on and off. It is claimed that the Gramme ring type winding is much superior in this respect to the iron clad armatures used by some other companies. The Commercial Electric Company, Indianapolis, the manufacturer, says these machines are most liberally designed in the matter of heating, a maximum temperature of 70 degrees Fahrenheit above the air being guaranteed. They have won a great many friends on account of their compactness, careful workmanship and superior design.

GENETT AIR-BRAKE LITIGATION.

Judge O'Brien, of the Supreme Court, New York, has denied the application of Charles Putzel for a writ of mandamus to allow him to examine the books and papers of the Genett Air-Brake Company. Putzel alleged that J. & W. Seligman & Co., had organized the Standard Air-Brake Company to obtain the patents and other property of the Genett Company, as judgment creditors, and that unless he was allowed to examine the stock certificate books and other papers the stockholders would be deprived of their rights and privileges.



W. C. Van den Berg is the new purchasing agent of the Milwaukee Street Railway Company.

C. Densmore Wyman, general manager of the Milwaukee Street Railway, was a welcome caller at the REVIEW office.

Frank Silliman has been appointed general manager of the Scranton Traction Company, Scranton, Pa. Mr. Silliman was connected with the Atlantic Avenue Line in Brooklyn.

Archie Force, for 10 years superintendent of the First-street Railroad, San Jose, Cal., is a married man, having won Miss Anna D. Russell, one of San Jose's fair daughters as his wife.

J. R. Beetem is general manager of the Peoples Traction Company, Philadelphia, having succeeded Lucien W. McIntyre. Mr. Beetem was general manager of the Scranton Traction Company.

Frank S. De Ronde, the very successful general sales agent of the Standard Paint Company, of New York, accompanied by J. C. Shainwald, their Chicago representative, were REVIEW callers last week.

G. R. Jenkins has resigned his position as superintendent of the Fox River Electric Railway Company, Green Bay, Wis. W. Eyer West, electrician of the Belle City Street Railway Company has succeeded him.

Albion E. Lang, president of the Toledo Traction Company, has been a frequent Chicago visitor. The plans for the improvements to the company's property were made here, and he has many details to decide.

S. R. Break, superintendent of the Detroit Railway, has resigned and is succeeded by L. E. Beilstein, who has for several years been connected with the Cleveland Electric Railway. Mr. Break returns to Canada.

W. W. Sargent, superintendent of the Fitchburg and Leominster Street Railway Company, Fitchburg, Mass., has been granted leave of absence for a year on account of poor health. He will try the climate of Colorado.

E. A. Wurster, secretary of the Falk Manufacturing Company, Milwaukee, Wis., called on the REVIEW. Mr. Wurster says the company is receiving inquiries every day with regard to its process of cast welding rails.

Hon. G. Hilton Scribner, formerly president of the Belt road in New York, and who has been traveling in Europe during the past two years, paid Chicago a visit this month and favored the REVIEW office with a delightful call.

L. B. Collins, secretary of the Steever Rail Joint Company, made the REVIEW a pleasant call. He reported a largely increasing business. The company has fitted up larger offices at 508 and 509 Garfield building, Cleveland.

John Brill has just returned from quite an extended trip in Europe, during which he combined business with pleasure, and brought home among other orders one for a complete equipment for cars, trucks and motors for an electric road in Africa.

A. Langstaff Johnston has completed the Hestonville, Mantua and Fairmount Passenger Railway Company, Philadelphia, and expects to take hold of another big project soon. D. A. Hegerty, his assistant, has been appointed general superintendent.

William S. Heger, general manager of the Wilmington City Railway, Wilmington, Del., and of the Gordon Heights Electric Railway Company, has resigned. Mr. Heger has gone to San Francisco, as the general western agent of the Westinghouse Electric and Manufacturing Company.

A silly newspaper rumor appeared in Cincinnati papers a few days ago, stating Superintendent John Harris had resigned, would retire and be succeeded by his son. That he will be succeeded by his son when the time comes is most likely, but Supt. Harris says he is good for another 30 or 40 years. President Kilgour promptly published a denial of the rumor.

A. M. Hinckley, superintendent of the Salt Lake Rapid Transit Company, Salt Lake City, Utah, has shaken the dust of the territory out of his clothes, and breathes the air of the east. He has been succeeded by Frank McBroom, who has been assistant superintendent. Mr. Hinckley has accepted the position of superintendent of the Toledo Traction Company, Toledo, O.

F. M. Bernardin, for three years assistant general manager of the Metropolitan Street Railroad, Kansas City, has resigned, and will go into the supply business in Kansas City. During a recent visit to Chicago, Mr. Bernardin called on the REVIEW. He said he had completed arrangements with several good companies, and expects to do a good business. He has opened an office in the Keith & Perry building.

Charles Hathaway, Sr., one of the young sports of Cleveland, has made it a custom for the last 40 or 50 years to take an annual fishing trip to Georgian Bay. This year was no exception and as usual he headed the list of biggest catches. His score was one giant muskallonge, 4 feet 6 inches long, weighing 41 pounds; another 23½ pounds and several 12 and 15 pound pike. Ex-mayor Blee, who is the official scorer for the Cleveland Club, vouches for the weights, and confirms Mr. Hathaway's statement that there would have been many more mammoths if the bait had held out.

PRIVATE TELEPHONE LINES.

Since the expiration of the Bell telephone patents the cost of purchasing and maintaining telephone plants has been cut to such a very low figure that all large corporations whose plants extend over any amount of territory feel it a necessity to have a telephone system of this nature throughout their works. For street railway companies the possibilities of complete telephone connection at reasonable expense, covering the entire system has been of the greatest possible value. The improved system of the Keystone Telephone Company, of Pittsburg, who have made a specialty of street railway business, enables the manager to be in constant communication with all departments, not only in the same building but all outlying stations, shops, car houses, and terminals; and if need be, every car on every line. A system of this nature is especially desirable for interurban lines that stretch for miles to country places which have no other telephone or telegraph communication, and where the revenue from tolls alone amounts to a snug sum each year. A telephone to work satisfactorily on a trolley system, must however, be of peculiar construction so as to avoid the great amount of induction that is bound to occur in running lines parallel with electric wires and feed wires. The "Keystone" has been constructed with this end especially in view, and the success of their apparatus is best judged from the high words of commendation which come from those who have installed this system. Many of the installments are on a very large scale.

Are you going to Louisville, to attend the 29th annual encampment of the G. A. R., September 11th to 14th? The Monon Route is the national official route, Chicago

to Louisville, and the Battlefield Line from Louisville to the South.

Special accommodations will be provided for all those who attend.

In addition to the two regular trains daily (morning and evening), special trains will be run at such hours as will best accommodate the veterans, and special cars will be furnished posts of twenty-five or more members if so desired. Also special sleeping cars can be arranged for.

The fare from Chicago to Louisville will be \$6.00 for the round trip, and from Louisville to Chattanooga \$6.35 for the round trip.

Tickets will be limited a sufficient length of time to enable members of the G. A. R. to visit Chickamauga battlefield. The National Park at that place will be dedicated with imposing ceremonies after the encampment at Louisville.

For rates, special trains, special coaches, sleeping cars and further information, address: Sidney B. Jones, City Passenger Agent, 232 Clark St., Chicago; L. E. Sessions, Traveling Passenger Agent, Minneapolis, Minn. Or Frank J. Reed, General Passenger Agent, Chicago.

THE IDIOT...

Was seldom caught napping, according to Mr. Bang's version; but what about the man who has purchased a lighting system having no other merit than low first cost? Will he not conclude that he must have been asleep when he finds that the excess cost in operation far exceeds the interest of an investment of double the price he paid? Even Bang's idiot would have seen the economy of paying a trifle more for a system perfect mechanically, efficient electrically, and embracing every modern improvement in approved manufacture like the Standard system. To put money in thy purse, read our book. Mailed free.

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H. H. WINDSOR,
Editor.

F. S. KENFIELD,
Business Manager.

CORRESPONDENCE.

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

THE STREET RAILWAY REVIEW,
Old Colony Building, Chicago.

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VOL. 5. SEPTEMBER 15, 1895. NO. 9.

ST. LOUIS is talking elevated road. With the present superior facilities an L road would not earn its salt. Better let well enough alone.

THE Providence commission in its fender report expressed a large healthy truth when it said: "A good, intelligent motorman is the best preventive of accidents on street railways."

IN some states the amount of capitalization of any one company is now limited by law. In Pennsylvania it is \$30,000,000 and in Missouri \$10,000,000. The Philadelphia syndicate rounded the horn however, by issuing \$30,000,000 and then renting the Traction Company organization with its \$20,000,000 of stock.

A MUNICIPAL judge in Rochester, N. Y., has awarded \$50 damages to a passenger who was ejected from a car by a conductor who refused to accept a transfer alleged to have been incorrectly issued. The decision is a vicious one, contrary to decisions already handed down in other states and certainly cannot be sustained in higher courts.

ELECTRIC lines are about to invade Egypt, and it is now only a few months until the graceful camel can hump himself to a boneyard, while tourists from Cairo to the pyramids will make the trip in a few minutes in a

trolley car. Then an incline railway up the big stone pile will be in order.

A DAILY in the east severely criticizes a superintendent for not getting his boxcars in service in place of the opens the instant a heavy rain storm burst. This is a favorite complaint of the public, who have no conception of the amount of work necessary to make the change. In many car houses, the winter cars, not in the shop repairing, are stored on a second or even a third story from which they must be lowered by elevators, a slow operation at best. Then the greater part of the equipment in use is at a considerable distance from the car house and may not reach it in less than thirty minutes or an hour. With the ample provision in the way of rain curtains carried on open cars, there is little need or advantage in exchanging for closed cars unless the storm is a long and unusually severe one.

AS THIS year's meeting of the American Street Railway Association will be held in Montreal, it will not be amiss to say a few words about wearing apparel. October is usually a mild month in that city, but the man who carries along a suit of heavy underwear and an overcoat will be wise, for he may wish he had them. Even in Atlanta a fall overcoat was found to be comfortable at night. It will not be necessary to have our money changed into Canadian coin or bills, for more United States money appears to be in circulation at par than does the Canadian money. As the latter is at a discount in this country, visitors will find it profitable to unload before they leave the other side of the line. The street railway men of Montreal promise a good time to all who accept their hospitality.

SO GREAT and rapid have been the visible accomplishments in electrical devices, the daily press and the public have hastily jumped at the conclusion that shortly the steam locomotive will become historical. While progress in electrical traction has been admittedly rapid and satisfactory there is yet a long bridge to cross before it can hope to supplant the locomotive. The change, if ever it becomes a radical one, will be by degrees. For suburban and terminal work many roads can undoubtedly employ electricity to advantage and even with economy in places, but the step from work of this nature to the hauling of heavy freights over long distances is a very long one. Until a far better method of transmission of current is discovered than is now at the command of the electrical engineer, the central power station, with all its economies in the production of power, cannot hope to compete with steam generated upon the track as traveled.

WHEN electric roads were first discussed in England the REVIEW predicted their advent would be the entering wedge which would in time bring about a unification of the classes in transportation. All classes freely patronize the electric roads, and have thus discovered that the third class do neither bite nor scratch the parties of the second class; nor do those of the second trample on the sacred

corns of dignity which all really aristocratic persons are supposed to possess. In other words, the foolish and old-time scorn which the "upper classes" have entertained toward the "lower classes" has had an opportunity to abate, with a corresponding decrease in the hate which the poorer people have entertained for the uppers. The transformation is not complete. Oh, no! but that any headway at all has been made in so short a time is really remarkable. To such an extent has the feeling reached, however, that the steam roads are seriously considering the running of certain trains with one class only.

CARELESSNESS in handling the series-parallel controller is in our observation, even more prevalent than was the case with the old style rheostat controllers. A part of this is no doubt the fault of the men who have charge of teaching the motormen. The series-parallel controller has cut down the starting current so that even skilled electricians do not realize the necessity of care in handling it. For the benefit of those who might wish to aid in teaching their motormen better ways, the diagram in the August REVIEW, showing graphically the results of the correct and wrong starting of cars, was reproduced with suitable explanations as an instruction sheet for motormen. The demand for these sheets has shown that we were correct in our surmise, that many managers could put them to good use. The approach of wet and cold weather in which there is always a good harvest of flat wheels, suggests the possible utility of some graphic diagram taken from actual tests that will help impress on motormen the right way to handle the brake, and the uselessness of sliding wheels when trying to make a quick stop. As we have said before, it requires more skill and experience to handle a brake in all kinds of weather than it does the controller, and the financial results are as bad in one case as in the other.

DOWN in Rome, Ga., and up in Bay City, Mich., the new woman has adapted the scheme of editing one issue of a daily paper, to street car operation. While many papers can be edited to advantage by women, or in fact almost any one except the folks who are now trying to do so, the new woman is getting altogether too new when it comes to running a street car. Of course her efforts are confined to the duties of a conductor as no manager would dare jeopardize his company's finances by running the risk of the damages which would ensue with so green and rattle-headed a creature as a female, who does not even know how to get off a car properly—in charge of the power. But we doubt the expediency or even right of a company to put the giving of signals to stop and start a car, into the keeping of a woman who has never had even one trip's experience. Conductors must go on as "students" in charge of experienced teachers before they are considered competent to take charge of a car. Another feature which will be better appreciated by the men than these enthusiasts who run cars for charity's sake, is the method of fare taking. If the male passenger has the temerity to tender only the exact fare he gets a

look or explanation that the car is for the day a vehicle of mercy, and unless he dives down in his bloomers and comes up with a handful of coin he is slaughtered on the altar of indignation. If, in the innocence of his sex he offers a quarter or a half, it is accepted with a sweet smile of approval and in lieu of the change he is wont to expect, is informed that no change is given as the receipts are for a hospital for infirm felines. The plan is all wrong and while it may have some commendable features when applied to certain lines of trade has no business around a street car. If the women really want to do something in the transportation line why don't they personally drive their own equipages as a 'bus line, and hang out a sign "Carriage to any part of the city, \$1 per minute."

THE starting of the high pressure, alternating current, long distance transmission, for electric railway work at Lowell, Mass., is one of the most important events in the electric railway line that has happened for several years, and may be considered as having fully as important a bearing on the electric railways of the future as the invasion of the steam locomotive field which has been a prominent feature of this season's work. The installation at Lowell is the first example of an electric railway on which the current is transmitted at high pressure from a central steam plant. It has previously been considered that it would be cheaper from an operating standpoint to build a separate steam plant for each section of a long road rather than put in the apparatus necessary for a long distance transmission. Our Lowell friends have evidently calculated the contrary to be the case on their road, and if a long distance transmission from a steam plant is good economy there it is economy in other places, and it will probably be extensively used. Against the cost of operating such a long distance transmission as that at Lowell must be charged, the interest on the money invested in the high pressure line between the central station and the sub-stations, the interest on the three sets of transformers, the wages of the sub-station men, maintenance of transmission apparatus and cost of the power lost in the three transformations. If we add to this a fair share of the expenses of the central station from which the sub-stations are operated, we have a lump sum which can be compared with the cost of operating a small station or stations for every section of line. There is no doubt a saving in labor in favor of the long distance transmission. The sub-stations need only one man on a watch, and if the sub-station is at a car barn he can attend to other duties as well. On the other hand the commercial efficiency of the transmission from central station to the trolley at sub-stations will practically never be over 80 per cent, and will usually be lower. The cost of a transmission plant for any given case cannot be named off hand, but is, of course, a very important factor in the problem. If the final balance is generally found to be in favor of one central station transmitting to sub-stations as against numerous small steam plants, street railway companies are not going to be slow about adopting it where their lines cover a large territory.

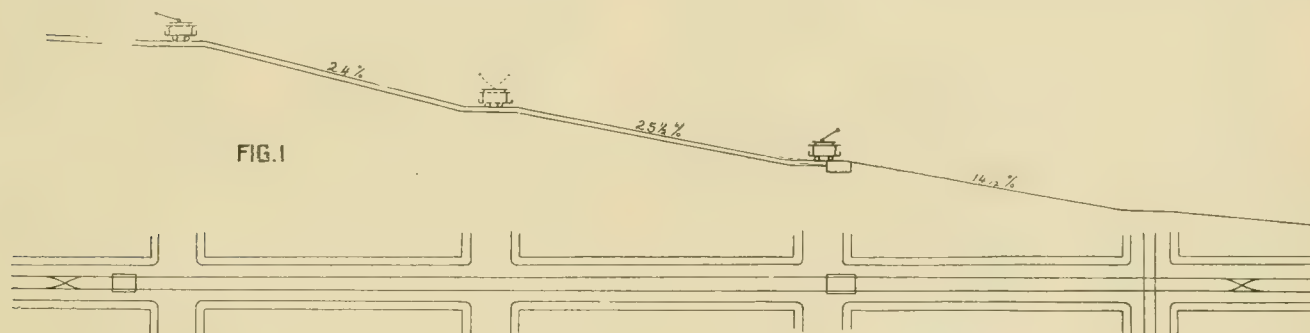
OPERATING AN ELECTRIC ROAD ON A 25½ PER CENT GRADE.

BY S. L. FOSTER, E. E. OF MARKET STREET RAILWAY COMPANY SAN FRANCISCO.

The Market Street Railway Company of San Francisco, California, controlling 170 miles of cable, horse and electric roads has during the past year been quietly changing its horse lines to the electric system and equipping with electricity all roads built upon the routes of new franchises. During this time upwards of seventy miles of electric roads have been completed or are under construction. These roads have all been built along the

factorily fulfilled all the conditions as existing on an electric street railway in a city as large as San Francisco and H. H. Lynch, the superintendent of construction of the Market Street Company drawing from his store of experience in constructing and managing, mining enterprises and cable and electric street railways, evolved a solution for the problem that is novel, ingenious, effective and at the same time very simple.

To use the fewest words, the device can be described as the use of an endless cable running over two tail sheaves, one at the top and one at the bottom of the grade. A car at the top of the grade on one track and a car at the bottom on the other track are rigidly fastened to this cable. The weight of the descending car bal-



lines of the latest and most approved eastern practice, looking to permanence, future growth and economy in operation, and naturally in the course of so extensive a piece of work many unusual problems in mechanical and electrical construction have arisen. The last problem to be overcome is the most interesting one and its solution seems worthy of being described for the many readers of the STREET RAILWAY REVIEW. The problem was to devise a method whereby cars on an electric road could be quickly, safely and cheaply conducted up and down two blocks of track in the fine residence portion of the city where the grades were 25.4 per cent and 24 per cent respectively. At the outset the company had as examples the various devices used for solving similar problems elsewhere, such as the steam and electric hoists in the mines, the counterweights as used in electrical street railway practice at Easton, Pa., Seattle, Wash., and Portland, Ore., the rack rails of Mt. Washington,

ances the weight of the ascending car and only the friction of the cable machinery, the rolling friction of the two cars and the difference in weight of the loads has to be overcome by the source of motive power. The road in question is a portion of the cross-town road extending along Fillmore, Sixteenth and Solano streets, from tide water at the foot of Fillmore street to tide water at the Union Iron Works ship yard. It is equipped overhead with the usual trolley construction using iron tubular side poles 5, 6 and 7-inch inside diameters, set solidly in concrete 6 feet deep. The road bed is constructed in accordance with the Market Street Company's standard cable road bed construction, using light but strong built wrought iron yokes and 70-pound long lipped girder rail. Besides the usual carrier depression, and crown pulleys expected on such character of roadway, a 1x4-inch continuous steel guide bar is fastened vertically to the yokes at about one half the depth of the slot. To this guide

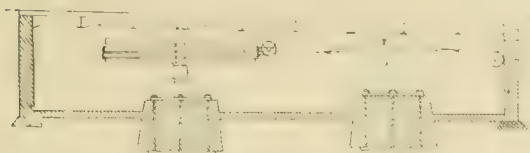
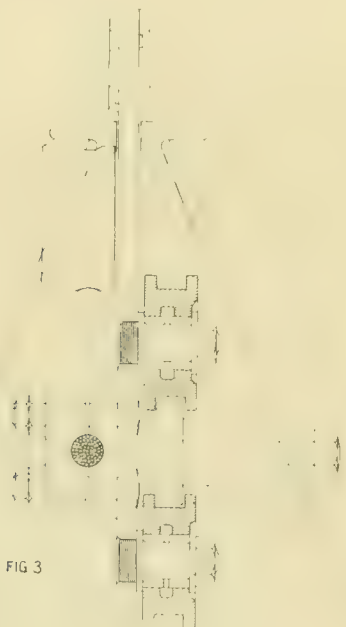


FIG 2

Pike's Peak and Mt. Vesuvius, the 65 per cent grade of Mt. Lowe, Cal., with its auxiliary electric motor, the incline planes of Cincinnati, Pittsburg and Allegheny and the hydraulic hoisting devices on the inclines at Marseilles and in Switzerland. Upon consideration, however, it was decided that none so far constructed satis-

bar the two grips are fastened, one at the top on one track and one at the bottom of the grade on the other track so that they can not become detached and yet are free to roll along on the guide bars. This feature is secured by the use, on one side of the grip shank, of 8 double flagged steel wheels, 4 above the guide bar and 4

below, thus holding the bar between the two channels formed by the wheel flanges. These grips are of steel an inch in thickness and about 3 feet long. The shank projects above the slot rails far enough to allow fastenings to be made to it for attaching to the cars. The guide bar keeps it projecting this same amount the whole length of the grade. Below, the grip is attached to the



cable by clamps 3 feet long and held by 12 $\frac{7}{8}$ -inch bolts thus giving a fastening equal to the strength of the rope. Provision is made at each end of the grade for dropping the grip below the level of the roadway into the tube. The cable is of crucible steel $1\frac{1}{2}$ inch in thickness and has a breaking strain of 62 tons. As the heaviest load it can ever be expected to bear will be two cars weighing 7 tons each and as the grade is 25.4 per cent the actual strain will be but $3\frac{1}{2}$ tons. In other words we have a factor of safety of nearly 18, whereas from 5 to 7 is considered ample allowance. At the top of the grade in a wheel pit are located two cast iron sheaves, one 10 feet in diameter, serving as an idler for the other, a $11\frac{1}{2}$ foot double clip sheave equipped besides with a flange for clamping on an immense circular wood lined band brake. The construction here is designed to prevent slippage and to provide a means for stopping the whole system independently of the cars. At the bottom of the grade is located another wheel pit containing another $11\frac{1}{2}$ foot sheave equipped with take up mechanism for taking up any stretch that may develop in the cable.

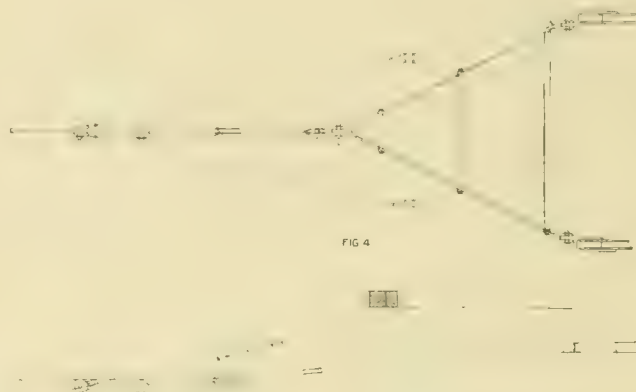
To the portion of the grip shank projecting above, the slot rails are attached 3 permanent steel cable pennants. One of $\frac{3}{4}$ -inch steel cable is attached to the middle of the grip and the other 2 of $\frac{5}{8}$ -inch steel cable are fastened to the end nearest the car.

On each car at one end a V shaped hinged draw bar is solidly attached to the truck frame. The end of this draw bar fits into a shackle at the end of the large $\frac{3}{4}$ -

inch pennant just mentioned and is held there by a $1\frac{1}{2}$ -inch steel pin furnished with a self locking toggle at the end. At each corner of that end of the car body, bolted rigidly to the steel I beams of the lower car frame is a heavy wrought iron eye into which is hooked the auxiliary or safety pennants that are connected to the end of the grip shank. When a car descends on the right hand track it leaves its grip at the bottom of the hill and the car ascending on the left hand track at the same time leaves its grip at the top. The next car coming down the right hand track upon arriving at the crown of the hill would find itself on the wrong track for coupling to the cable as would the car coming to the bottom of the grade on the left hand track. To save time under the varying conditions Mr. Lynch provides the simple expedient of a diamond crossover consisting of two symmetrical intersecting crossovers, at both top and bottom of the grade.

As a final measure of safety, a derailing switch is to be located at the top of the hill. It will always be necessary for the conductor of a car, approaching the grade to descend, to go forward and open the derailing switch before the car can pass over the crown of the hill. In case a car got beyond the control of the motorman and struck this switch the car would simply run off at an easy angle on to the soft bituminous pavement of a level intersecting street. The two cars being hooked on to the cable the conductor of the car at the top of the grade with an ordinary double contact key rings a gong within hearing of the conductor of the car below. This conductor replies and the system is ready to operate.

Before telling the reader what we do next it may be of interest to mention the fact that various wild and discouraging prognostications were indulged in by numerous engineers and laymen. The power that would be required to work the system, so they



prophesied, was going to run as high as 250-horsepower. The fact (?) that the traction of a descending car greatly exceeded that of an ascending one was reverted to frequently as a feature likely to detract from the success of the plan, and one engineer even boldly asserted that beyond 20 per cent no traction at all could

be obtained! The superintendent, however, kept in mind the well known law of the inclined plane, that of the two components of the weight of an object lying on an inclined plane, the component vertical or normal to the plane is equal to the weight of the object multiplied by the cosine of the angle of inclination—in this case, .9691, and also the fact that in Seattle, Wash., a single track car on the Rainier Avenue Electric Railway Company's line found no trouble in climbing unaided and without sand a 17 per cent grade. On the trial trip it was found that with the controller handle of a General Electric K controller on the series point or third notch, the car being equipped with two G. E. 800 motors, one empty car descending was able to work the whole system, drawing up a fairly well loaded car at 4 miles an hour. The mechanism has been working without a hitch ever since the starting trip—one car only furnishing the motive power.

There are really only three problems to solve.

First, to lower the first car. This is done by the large band brake previously mentioned as encircling the flange of the double clip sheave. The handle governing this brake is brought up at the crown of the hill so that the man manipulating it can see the car during the full course of its descent.

Second, to operate the road regularly. The procedure is the same as outlined above; one car—usually the descending car—doing the signalling, starting and stopping of the whole system. The question may arise—"Suppose the other car wanted to stop, how could the motive car be apprised of the fact?" It is found that when the motive car is only on the third notch the motor-man on the dead car can stop the whole system by applying his brake. That would be signal enough for the motive car to shut off the current. The company's rules allow stopping only at street crossings, so such exigencies as suggested would rarely occur.

Third, to raise the last car. This is done by using an auxiliary dummy car weighted to about the weight of a regular car. At the time of shutting down the road this dummy is towed to the crown of the hill and is used to raise the last car. The dummy remains on the street from 1.30 A. M. to 4.30 A. M. and is raised at starting up time by the first descending car and sent back to the car house. When more than one car is used on the portion of the road beyond the grade no difficulty arises as one descending car will raise two ascending ones provided two cars use the current.

It is comparatively an easy matter for a car after reaching the crown of the hill to couple up, signal, descend the 700 feet of grade, uncouple and be ready to proceed in 2½ minutes. The coupling requires but 15 seconds. With two equally loaded cars, the descending car only using current, from 40 to 27½ amperes were required or from 28 to 18 electrical horse power, depending on whether the descending car was on the 24 per cent grade and the ascending one on the 25.4 per cent grade or vice versa, the speed being 4½ miles an hour.

Figure 1 represents diagrammatically the whole incline

showing wheel pits, cars passing at the middle of the trip and all the general features of the proposition.

Figure 2 shows a section of the tube including guide bar and grip.

Figure 3 shows the details of the grip.

Figure 4 shows the details of the draw bar.

CYCLONE AT PITTSBURG.

Pat Shae, a Traction Company Fireman, Carried 100 Feet Into the Air.

A terrible storm of wind and rain visited Pittsburg, and paid its special attention to the street railways. Light, telegraph and telephone wires were grounded and many buildings unroofed and much damage done to shipping in the river. The roof of the waiting room of the Monongahela incline road was torn off.

The power house of the West End Traction Company suffered most. The station is about fifty feet below the level of the Point bridge. The roof was completely torn off and carried up Carson street for five or six squares. The stacks, which are half-inch iron, three feet in diameter, were torn off and carried along like playthings. Patrick Shae, the fireman, was down in the boiler room. He was picked up bodily, carried up through the roof and nearly 100 feet into the air. The wind blew him over the towers of the bridge and he landed over 300 feet up Carson street. When picked up he was unconscious. Six of his ribs were broken and he was injured internally, but has been doing nicely and is in a fair way to recover. The station was shut down two weeks to repair the damage although the work was pushed with the utmost speed by general manager W. J. Burns. The line was kept running by renting power during repairs.

TROLLEY REDUCES RAILROAD FARES.

Those persons who stand in their own and other peoples' light by a foolish and shortsighted objection to the construction of interurban electric lines, will do well to reconsider their position. The Baltimore & Ohio road has, in self defense, and for no other reason, been obliged to reduce its fares about 25 per cent in the vicinity of Philadelphia, Baltimore, Washington and Pittsburg. The reduction applies to suburban business to points near the cities mentioned, where formerly the steam road had a monopoly and where now the electric service with frequent cars and low fares, has invaded the territory. The same is true of the Reading and the Pennsylvania lines to Philadelphia suburban points. The effect of this reduction is two-fold, for while it makes a direct saving to the pockets of the suburbanites, the reduced price of fares attracts residents, which means a corresponding increase in the value of property. Some people would serve unless fed with a spoon, but there seems no excuse for an able bodied man who is supposed to be in the full possession of his senses, blindly opposing improvements, which cannot fail to benefit him and all his neighbors.

Street Railway Review

HANDLING INTERURBAN FARES.

PART III.

For three years the Oakland, San Leandro & Haywards Electric Railway Consolidated, Oakland, Cal., has been operating an interurban road between the three cities named in its title. H. W. Meek is president, A. L. Stone, secretary and Frank M. Leland, superintendent. The management had no guide to lead it out of the laby-

fares, transfers and commutation tickets when the holder wishes a short ride. The country division has six fare divisions with cars running every half hour. The fares are 5, 10, 15, 20, 25 and 30 cents, round trip tickets for which 12½ and 25 cent hat checks are issued. Transfers from other lines are also collected and commutation tickets accepted.

All cars are supplied with fare registers. When a passenger pays a 5 cent fare, the conductor rings it. Higher rates of fare are recorded by tickets. If the passenger

Name
TICKET
TRIP SLIP
O.S.L.&H.E.Ry.
CONSOLIDATED.

Date
Badge
Trip
Direction

1 PASSED
2 Officials
3 NAMED
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31

Employees
Conductor 4
(B'DG NO.)
Motorman 4
(B'DG NO.)
Policemen
(B'DG NO.)
Children
(NUMBER)

2 3 4 5 6 7 8 9 10 11 12
10 9 8 7 6 5 4 3 2 1

Oakland, San Leandro & Haywards
ELECTRIC RAILWAY
Consolidated] Fri. July 5

This transfer is valid for the passenger who is presented at point of transfer and is valid until the fare is paid by the passenger and is not valid for the conductor of the transfer.

Alfione Sec'y

From To
Oakland San Leandro
San Leandro Haywards
Haywards Oakland

18 19 20 21 22 23 24 25 26 27
18 19 20 21 22 23 24 25 26 27

Individual Monthly Commutation and Special Rate Ticket

OAKLAND, SAN LEANDRO & HAYWARDS ELECTRIC RY CONSOLIDATED
Between SAN LEANDRO AND HAYWARDS

1895 JULY 1895

259 1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10

OAKLAND 12 1/2
SAN LEANDRO & HAYWARDS
ELECTRIC RAILWAY

OAKLAND 12 1/2
SAN LEANDRO & HAYWARDS
ELECTRIC RAILWAY

OAKLAND 12 1/2
SAN LEANDRO & HAYWARDS
ELECTRIC RAILWAY

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SAN LEANDRO & HAYWARDS
ELECTRIC RAILWAY

OAKLAND 12 1/2
SAN LEANDRO & HAYWARDS
ELECTRIC RAILWAY

TICKETS ETC. OF OAKLAND, SAN LEANDRO & HAYWARDS ELECTRIC RAILWAY CONSOLIDATED.

rinth of trouble it entered, when an adjustment of rates of fare was attempted. Many plans were tried and most of them discarded because they were found to be impractical. Through the kindness of superintendent Frank M. Leland the REVIEW is able to present the system that has been adopted after three years of experience.

The road is nearly 16 miles long, being operated in two divisions, the city division and the country division. The country division cars also run over nearly all of the city division tracks, the only difference being that the city division gives a 7½ minute service and is for Oakland people only. All the fares collected are 5 cent

wishes to pay a 10, 15, 20, 25 or 30 cent fare the conductor collects it and issues a hat check properly punched. The single fare between Oakland and San Leandro is 15 cents and from San Leandro to Haywards, the same, while the fare from Oakland to Haywards is 30 cents. When passengers buy return tickets they receive a reduction to 25 cents round trip for the shorter distances and 50 cents round trip for the longer. This necessitates the giving of a 12½ cent hat check in the first instance and a 25 cent hat check in the second. The passenger receives a coupon for half the amount of fare which he retains until the return journey, and a hat

Oakland, San Leandro & Haywards Electric Ry.

GOOD FOR THIS TRIP ONLY.
The conductor is required to furnish a check to each person who transfers.

THIS CHECK is void and forfeited when the point of destination is reached by the car, or the passenger leaves the car before it reaches said point of destination.

Alfione SECY. FORM "A" H \$1

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Alfione SECY. FORM "A" H \$1

check like sample shown in the illustration, on which is punched his destination. The other half of the round trip ticket is kept in the conductor's book of tickets to be sold. The illustration shows a sheet of 12½ cent tickets and a sheet of 20 cent hat checks.

The company also sells a commutation ticket good for a month for \$3 between Oakland and San Leandro and San Leandro and Haywards, and \$5 from Oakland to Haywards. A sample of one of these tickets is shown. The plus and minus marks opposite the man's and woman's face serve for identification. On the reverse are these conditions: "It is expressly conditioned between the purchaser of this ticket and the Oakland, San Leandro & Haywards Electric Railway Consolidated, in consideration of the commuted, special reduced rates, provided by this ticket, that the company may at any time reduce the number of trips and change the hours of leaving and arriving; that this ticket is not transferable and is not good for passage until the signature of the purchaser is made in ink on the face thereof; that if presented by any other person than the purchaser whose signature in ink is made upon the face thereof, it may be taken up by the conductor and canceled without rebate; that it is good only for passage (in the manner designated) between the places, for the trips and during the month designated therein, and will not be replaced or duplicated if lost, or accepted for passage if so mutilated as not to be readily legible; and that such purchaser will for the purpose of identification, write his signature when requested by any agent of the company, and will comply with such other reasonable regulations as may from time to time be adopted to prevent the misuse of this ticket." The conductor's ticket slip given in the illustration is to record by punching the commutation tickets punched. The \$3 tickets are recorded by punching the figures on the slip, and the \$5 ticket by punching the other side of the slip. The company also sells 25 celluloid checks for \$1. Conductors are obliged to turn in a trip sheet. The trip sheet of the country division shows the commencing and closing numbers of commutation tickets, hat checks and register endings of cash fares, and the number of tickets and fares received, number of transfers, persons passed, and celluloid checks. The names of officials passed are required as well as numbers of employes, policemen and mail carriers carried. The form for the city division shows transfers and tickets registered, opening and closing numbers of registers and number of cash fares registered.

The cars of both divisions start at First and Washington streets and go to East Oakland to Twenty-third avenue, where city division cars turn. Transfers are issued to passengers who desire to go on the country division which are good to High street, and any one can get on a car with a transfer and 25 cents and go to Haywards. Transfers are not rung up, but are cancelled with a punch and turned in.

Each conductor is supplied with a different lot of hat checks, which are furnished in books, carried by straps and indexed so that different denominations can be easily

found. Each issue of checks is distinguished by a different letter, so that while two conductors may be on the same number, the tickets can be traced. Hat checks are charged to the conductor taking them out of the office. By punching the different letters "O," "SL" and "H," the passenger's destination is marked. When the destination is between the two points the punch is put in the space between the letters. Fare divisions are from Oakland to High street, Elmhurst power station, San Leandro, San Lorenzo Junction, Ashland-Castro Valley Junction and Haywards.

THE PERFECT FENDER.

The commission appointed by the city of Providence, R. I., to examine and report on the fender question, reported in part as follows:

"Having examined the reports of the various commissions appointed in Baltimore, New York, Brooklyn and Philadelphia, your commission proceeded to examine into the merits of various patented and other devices, some with and some without working models, that were exhibited before them by various persons. Of these contrivances only four were regarded with favor by your commission. But your commission do not consider that these fenders are perfect. No fender should be adopted without a wheel guard, which, in the opinion of the commission, should extend entirely around the car.

Your commission are convinced that the most successful device for saving life on street railways is a light projecting fender which shall readily pass over, without injuring, the human form which it may fail to trip and catch, or which may be already prostrate; and which is supplemented by a wheel guard close as possible to the wheel to be brought into action automatically rather than by the foot of the motorman, and provided with powerful springs to bring the guard into contact with the rail and street surface, but it is the opinion of your commission that there is not any fender that is always sure to save life. A good, intelligent motorman is the best preventive of accidents on street railways, and to that fact, perhaps, is largely due the immunity we have had in Providence from frequent accidents during the three years the electric cars have been in operation.

"The managers of the railroad company have afforded the commission every assistance in the consideration of this subject, and have provided cars at all times upon which to test the various fenders submitted for trial. They have agreed to equip their cars with suitable wheel guards, and with one of the fenders selected by your commission just as rapidly as it is possible to build them."

A malicious person entered the power house of the Lima, O., Electric Railway and drew some wires out of a generator field. Their absence was discovered when the engine was started in the morning, and it was not until 3 P. M. that the road began operation.

MASSACHUSETTS MEN ON THE MERRIMAC.

The Massachusetts Street Railway Association is noted for its good times. The last was an outing under the auspices of the directors of the Lowell, Lawrence & Haverhill road.

Among the prominent members of the party were Josiah Quincy, R. S. Brown, C. S. Clark of Boston, Mayor Harwood of Lynn, State Treasurer E. P. Shaw of Newburyport, Charles H. Odell, J. T. Mahoney, Thomas H. Johnson, J. M. Peterson of Salem, J. H. Cunningham of Chelsea, H. B. Parker, A. L. Gordon, L. H. McLain of Newtonville, B. J. Weeks, J. R. Graham, John F. Morrill of Quincy, J. H. Alvin of Concord, Charles Goss of Amesbury, Supt. Woodman of the Lowell & Lawrence, Supt. Wentworth of the Lowell & Suburban, Supt. Lynde of the Haverhill, Merrimac & Amesbury, and Supt. Dennis and Treasurer Calif of the Newburyport & Amesbury.

DOESN'T KNOW WHEN HE'S BEAT.

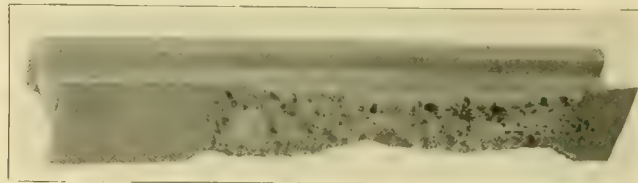
Either Mayor Pingree of Detroit fails of ordinary comprehension in understanding the very plain and decided ruling of the United States Court of Appeals, which some months ago vigorously sat down on Pingree's suit of the city vs. the Detroit Citizens Railway; or, which seems altogether more likely, he is bent on carrying his personal spite to the extreme limit of possibility. As long as the city, and not Pingree, has to foot the bills, he seems to think he can stand an appeal to the United States Supreme Court. That is what he is trying to do, but the chances appear to be about as able bodied as a bullrush. He still talks fervently about Detroit owning some cars and tracks of its own; a condition he admits is his favorite hobby. Pingree better dismount before the hobby throws and runs over his belligerent anatomy.

BALTIMORE WASHINGTON ROAD BEGUN

One of the important undertakings of the year—that of the electric road from Baltimore to Washington has been begun and the project which has been so much talked of for several years is at last to become a reality. E. D. Smith & Son, contractors, of Philadelphia, have begun the work. Contracts have been placed for 13,000 tons of steel rail, of which 10,784 tons will be 85-pound. The route is popularly known as the "boulevard" line but its official title is the Columbia & Maryland Railway Company. The right of way was partly acquired by the purchase of several other companies, as noted in our July issue, among which is the Eckington & Soldiers' Home, of Washington. The distance between the cities is about 40 miles. The officers are, Thomas M. Lanahan, president; B. N. Baker, vice-president; Ernest McElroy, treasurer; R. Stanley Carswell, secretary; W. Kesley Schoepf, general manager. This will be one of the most important electric interurbans in the country, and will probably do a large amount of through business between the cities. Two steam roads now connect them.

RAIL MELTED BY ELECTRIC ARC.

A very peculiar accident, and one that is not likely to happen in one case out of thousands, was recently the cause of the melting of a rail on a steam road at North Attleboro, Mass. The New York, New Haven & Hartford Railroad crosses Mount Hope street in North Attleboro on an iron bridge. The bridge is so low that the

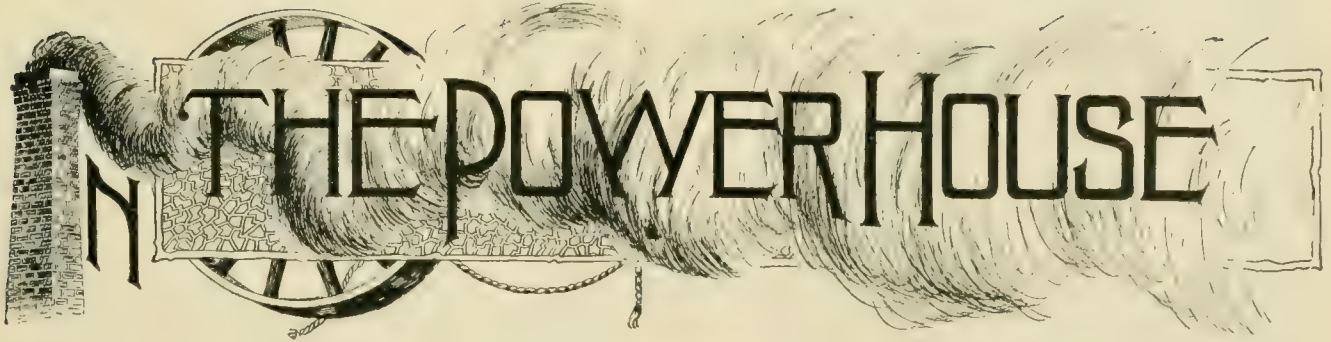


MELTED BY AN ELECTRIC ARC.

trolley wire of the electric road which passes under it is not continued under the bridge, but is anchored at each side by strain insulators to the iron girders of the bridge. The trolley pole is held down when going under the bridge, and the car runs by momentum. On the date of the accident we are describing, one of the strain insulators by which the trolley wire was anchored to the girder, broke. Under ordinary circumstances this would have had the effect of grounding the trolley line so that it could not be operated until the leak was removed, but it happened in this case that the bridge girders were sufficiently insulated from the surrounding earth so that the line was not seriously grounded. The girders rested on masonry at the ends and the rails on the bridge were insulated from the girders by the ties. The effect of this state of affairs, was, to cause a difference of potential of 400 to 500 volts between the track, which was grounded, and the bridge girders which were connected to the trolley through the broken insulator. Such conditions were not likely to remain in force long until an arc would be started between the rails and girders. This was exactly what happened. The transverse girders come within three-quarters of an inch of the bases of the rails, and at one of these points moisture or dirt started an arc and the destruction of the rail by the intense heat began. If the arc had not been such a long one the current would have been great enough to short circuit the power station and open the circuit breakers. As it was the arc simply melted the rail away until the trouble was discovered. We are indebted for the photograph to Superintendent C. A. McAlpine, of the Providence division of the N. Y., N. H. & H. R. R.

ADVERTISING ON THE CLOUDS.

Manager Erb, of the Leavenworth Electric Railway has secured a device which will increase the utility of the searchlight described in the August issue of the REVIEW. Recently he had the searchlight in operation, when the crowd was surprised to find on the clouds these words: "Don't advertise here," which were quickly followed by "Post no bills!"



This department is devoted to the construction and operation of electric railway power houses. Correspondence from practical men is specially invited. Both the users and makers of power house appliances, are expected to give their views and experiences on subjects within the range of the department.

Chicago now is a very interesting place for those who wish to study electric railway power plants. It has examples of nearly every kind of electric railway power plant construction and apparatus from a high speed belted station to those depending mainly on 1,000 and 2,000-horse-power direct connected units. Two of the latter kind are described in this department this month. Those of our readers who have occasion to visit Chicago and would like to look over the various institutions for "grinding out electricity" in the city and vicinity may be assured that the REVIEW staff will be glad to assist to the extent of its power in making the visit a pleasant and profitable one.

A variation from the usual custom of piping all the oil from one tank to the machinery in a large power plant has been made in the station of the Metropolitan Elevated Railroad of this city. A small oil pump is belted to the shaft of each unit and each engine thus pumps its own oil through its own individual filters and oil piping system. This arrangement does away with much of the oil piping around a station and when once adjusted requires the minimum of attention. At the same time it increases the number of oil pumps and filters to be taken care of.

Even for those who have been actively engaged in electric railway work it is somewhat startling to consider the wonderful increase in the number of large direct connected generators since 1893. The 2,000-horse-power unit in the power station of the intramural road at the World's Fair was looked upon as a monster that was built more for exhibition purposes than anything else. A great many electrical engineers asked what would be done with the "elephant" after the fair. They thought that certainly no road would want such a machine for several years to come. As an actual fact orders were in hand for a number of them before the close of the fair. Now direct connected units of 1,000 and 2,000-horse-power rated capacity are becoming so common in our large

cities that they have ceased to be objects of curiosity. How much larger machines will be built in the future it is not safe to predict. So far the 2,000-horse-power limit has not been exceeded.

The cost of generating electric railway power is a subject upon which we hope to throw more light before many months. It is known what ought to be the performance of engines and generators when working on a steady load but as to the actual performance of power plants when working under various commercial requirements, very little reliable information is available. Especially is this true of electric railway plants. It is only by a comparison of results that street railway companies can hope to generate power most economically. Accordingly we have taken it upon ourselves to obtain figures on electric railway station performances from as many electric railways as are willing or able to give them and will shortly be able to publish results that will be of great benefit to the industry. As we are doing this for the benefit of our readers we think we have the right to ask for prompt and willing responses from them. Some roads do not keep any power plant records. We hope for their own good that they will begin to do so soon. Others have records but prefer to keep them secret. We have only to remind such that when requested we will not give out the name of the road and that it is altogether likely that they are doing themselves more harm by refusing to co-operate in this mutual benefit movement than they would by revealing confidentially to two members of the REVIEW staff the secrets of their power plant performance. As every electric railway in the country has by this time received report blanks from us for this purpose it will not be out of place to say a few words regarding the ideas governing us when the list of questions was made up. The list might have been made much longer but it was thought better to have a few questions that could be answered by many than many questions that could only be answered by a few. The basis of all calculations according to our plan is the electrical-horse-power-hour. This was adopted for the simple reason that the electrical-horse-power-hours can be accurately calculated from the daily switchboard readings taken in all well regulated plants. In no way can the output of a station be as easily and accurately found as at the switchboard. It is therefore the most available

basis for comparison. The car mile basis while interesting in some respects is not a proper basis, because it involves items having nothing to do with the power house performance.

The battle still wages between the advocates of belt or rope drive and direct connection. Speaking of the matter of space, here are some figures on the floor space required in the engine rooms of five of the most recently built power plants in Chicago. They do not prove much either way, unless it is that it is very easy to design a direct connected power plant that will take up as much room as one that is not direct connected.

ENGINE FLOOR SPACE.

West Chicago Street Railroad, (Western avenue); cross compound, horizontal direct connected engines; five 2,000-horse-power, one 1,000-horse-power; square feet floor space per horse-power, 1.29.

Metropolitan Elevated; vertical cross compound condensing direct connected; two 1,000-horse-power, two 2,000-horse-power; square feet floor space per horse-power, 1.62.

Chicago City Railway; five horizontal 1,400-horse-power two cylinder simple corliss engines driving by ropes ten 700-horse-power generators; square feet of floor space per horse-power, 1.67.

Chicago Electric Transit Company, (California avenue); six horizontal direct connected cross compound condensing engines of 1,000-horse power each; square feet of floor space per horse-power, 2.73.

Chicago General Railway; four 450 horse-power cross compound condensing corliss engines; belt drive; equal number of generators; square feet of floor space per horse-power, 5.

In this statement the machinery for which each station is designed and not the present capacity is taken. The rated horse-power of the engines was the basis of calculation and may be lower in some cases than it ought to be for a fair comparison with the others on the list. A study of the list shows that the size of units has an all important bearing on the capacity that can be put in a given space. For example, in the Metropolitan Elevated power-house the two 1,000-horse-power units take up to all practical intents and purposes as much room as the 2,000-horse-power units. The California avenue plant could also be doubled by doubling the size of its units without the necessity of enlarging the engine room, although it would be slightly more crowded than at present. Probably the most surprising plant is that of the City Railway which, although employing rope drive, ranks among the direct connected stations for economy of room. This is partly due to the use of simple engines of such large capacity, whereas the others are all compound.

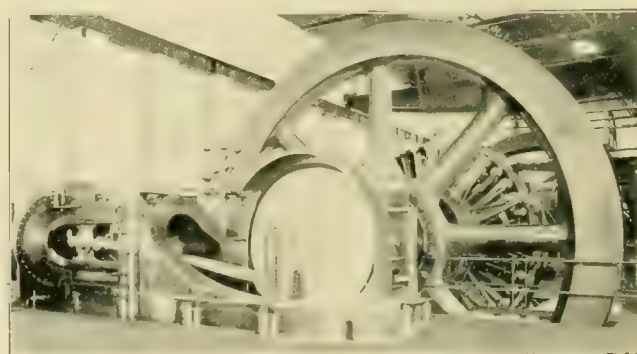
Two of Chicago's Greatest Railway Power Plants.

There are now four great electric railway power plants in operation in Chicago with a fifth under construction. Those supplying the Metropolitan Elevated and the Chicago City Railway have already been fully described in these columns. The two others which supply the North and West Chicago Street Railroads have been under construction for a year past and although in partial operation for some time, have not been completed until now, and we have thought best to wait until these magnificent undertakings were finished before presenting an account of them.

The stations we are about to describe are known as the Western avenue and California avenue plants. They have many features in common, both being built under the supervision of S. Potis, Jr., chief engineer of the North and West Chicago Street Railroads. In their construction no money has been spared that would help to make them represent the most advanced practice. The main differences in the construction of the two plants is due to local conditions. That at California avenue is on the river on a prairie where land and condensing water are plenty, while that at Western avenue is somewhat crowded for room and is miles from condensing water.

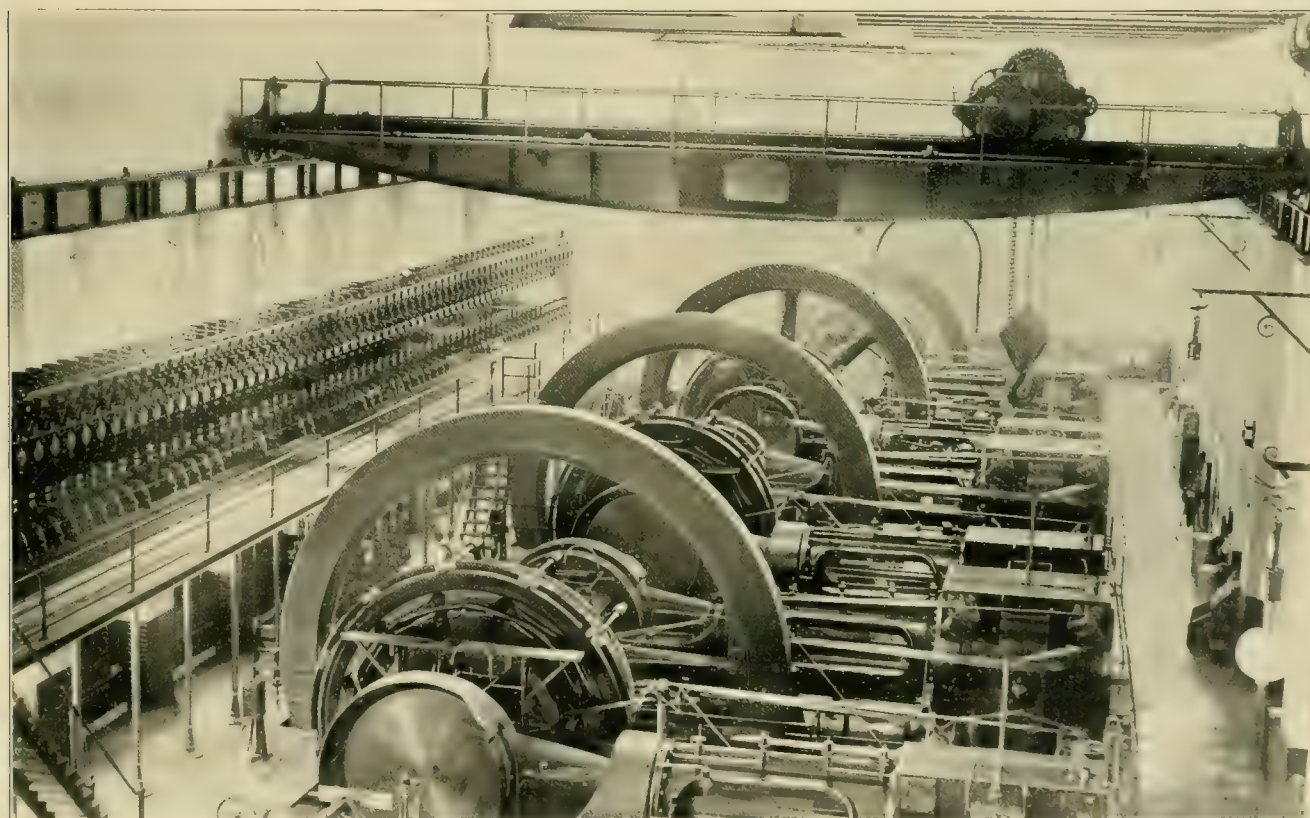
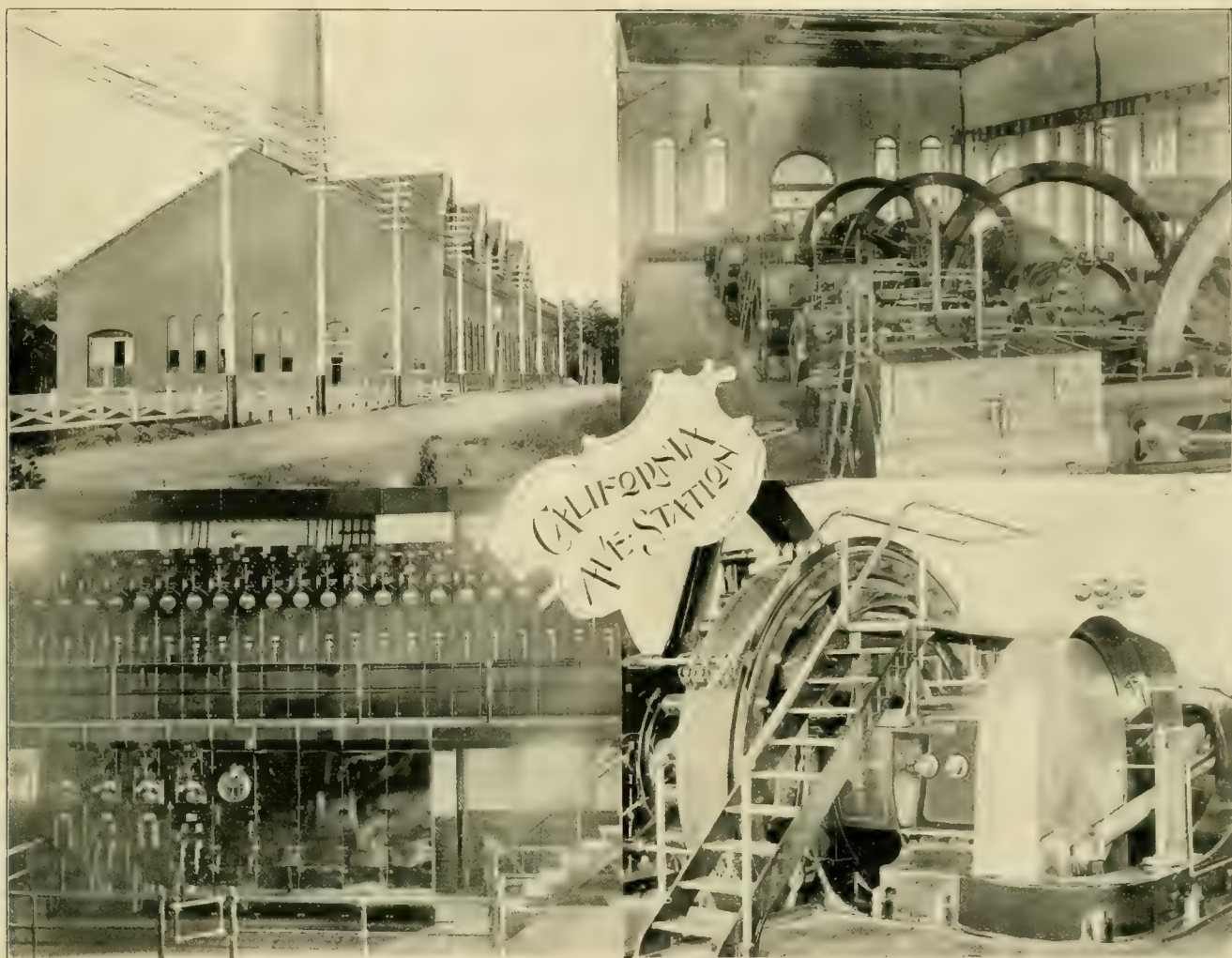
THE WESTERN AVENUE STATION.

as it is commonly known, was erected by the West Chicago Street Railroad for supplying its west side lines, and is located at Western avenue and Washington boulevard, which is near the center of the district it supplies. Arrangements have also been made whereby this plant will also supply power to the Lake street elevated road. The location was owned by the company previous to its use as a power-house site. As the station stands now it is capable of an output of 7,000-horse-power. When entirely filled with machinery its capacity will be 11,000-horse-power, so that it is planned for the largest electric railway power plant in the world. Whether it will be the largest by the time the full amount of machinery is put in of course remains to be seen. As it stands now there is only one other electric railway plant in Chicago, which equals it in capacity, viz.: that of the Chicago City Railway. The Metropolitan Elevated plant, described in our May issue, has a nominal capacity of 5,000-horse-power as does the California avenue plant, described



2000-HORSE-POWER UNIT—WESTERN AVENUE.

later in this article. The plant under discussion contains three engine and dynamo units of 1,500 kilowatts capacity and one of 750 kilowatts. The engines are cross compound. The cylinders of the 2,000-horse-power machines are 34 and 54 inches by 60 inch stroke. Those on the 1,000-horse-power machine are 26 and 40 inches by 48 inch stroke. The diameter of the fly wheel is 25 feet on the 2,000-horse-power engine, and 20 on the 1,000-horse-power. The 25 foot wheel weighs 80 tons. The revolutions per minute are 75 on the 2,000 and 80 on the 1,000-horse-power engines. The generators are from the Siemens & Halske factory, and are the usual internal



ENGINE ROOM WESTERN AVENUE STATION

field type built by that company for direct driving. The armature winding consists of copper bars and the surface of the armature is turned off to form the commutator. These machines perform their duty in a very satisfactory manner as is customary with the large direct connected units built by this company. Room is provided for two more 2,000-horse-power units similar to the three now running.

The engine room of this station is 57 by 250 feet, and has an iron floor and basement similar to the California avenue plant, except that there are no condensers in the basement. As in the other station all piping and wiring is run under the floor so as to give full swing to operation of the two Walker hand power cranes which span the engine room.

The switchboard is made up of General Electric panels. The feeder board in the gallery has 76 panels. The generator panels are on the main floor. Two Thomson recording wattmeters measure the output; one serving each half of the generator board. The generator panels have in addition to the regular General Electric apparatus a Siemens & Halske device for opening the shunt field circuit. This is an arrangement whereby the final break of the field circuit is made by gradually separating two carbon points until the arc gets so long that it breaks the circuit. This method, it is claimed, gets rid of the dangerous inductive kick when the field circuit is opened. All the feeders leave the station from one corner of the engine room basement. From the switchboard they pass straight down and then run along a rack on one wall of the basement to the manhole of the underground conduit on Western avenue.

The boiler room contains twenty 400-horse-power



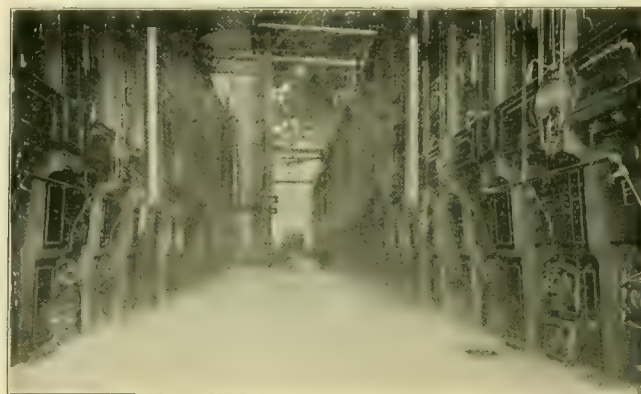
FEEDER RACK - WESTERN AVENUE.

Stirling water tube boilers. This was said to be, the largest single order of the kind ever placed at the time it was made. As room is so valuable in this station, oil fuel is used, and no provision is made for burning coal. The

boilers are placed face to face with a narrow aisle between. The oil for fuel is kept in long tanks under the sidewalk under the Washington boulevard front. Four 2,000 horse-power exhaust steam heaters are ranged around the base of the stack near which are also the two boiler feed pumps and the pumps for the oil fuel system. A simple gravity system of oiling is employed. The building is heated with exhaust steam by the Warren-Webster vacuum system. The main exhaust of the station is 40 inches in diameter, and passes up alongside the stack. The stack is the largest in Chicago, being 220 feet high, 16-foot flue, 27 feet square at base and on a foundation 48 feet square.

CALIFORNIA AVENUE POWER PLANT.

This plant is the property of the Chicago Electric Transit Company, a company intimately connected with



5,000-HORSE-POWER IN BOILERS—WESTERN AVENUE.

the North and West Chicago Street Railroads to which it supplies power. It is at California avenue and Roscoe boulevard, about $7\frac{1}{2}$ miles in an air line from the heart of the city, and supplies all the lines in the northwestern part of the city to within about three miles of the downtown district. During construction, before other power houses were finished it has supplied lines 7 to 8 miles distant. It was the first direct connected railway power plant started in Chicago and was the first electric power plant built here by the Yerkes interests. It may be considered as containing all the refinements that mark the most advanced railway power plant construction, with the exception of coal and ash handling machinery which has not yet been installed because of the use of oil fuel until very recently, but which will soon be in place. Construction was begun on it in June 1894 and before New Years 1895 it was supplying power. It is a handsome structure as the engravings show. The main dimensions are 245 by 122½ feet, and it is 36 feet from floor to eaves. Half of the building is boiler room and the other half engine room, making the dimensions of each 245 by 61 feet. There are now four 1,000 horse-power direct connected engines and room remains for two more of the same size, so that the ultimate capacity of the station is 6,000 horse-power.

Before going into the details of the equipment it is interesting to note that the building is absolutely fireproof.

It is of pressed brick with corrugated iron roof and the engine room floor is rolled steel plate. The boiler room floor is of concrete on brick arches.

The building has a basement 10 feet deep under the entire floor, that under the engine room being taken up by pipes, wires and condensers, and that under the boilers receiving the ashes. The steam plant consists of ten 300-horse-power water tube boilers, and these are equipped with twenty Murphy automatic smokeless furnaces, made by the Murphy Iron Works, Detroit, Mich. In connection with the furnaces there are storage bins, conveyors and chutes, which deliver the coal into the furnace magazines from which it is fed automatically into the grates, and the furnaces are so arranged that the ash and clinker is sifted and ground automatically into the ash pits which also are fitted with conveyors, so the process of supplying the coal feeding the furnaces and cleaning out the ash and clinkers is constantly going on automatically.

The coal conveying system is being put in by the Borden & Selleck Company of Chicago, and will be the finest plant of the kind in the west. In connection with this a 2,000-ton coal storage house, 200 by 20 and 20 feet high is built some distance back of and parallel with the boiler room. Each wagon of coal is weighed on entering the yard and is then driven to one corner of the coal storage house. Here arrangements are made for dumping it. The load when dumped takes one of two courses. It either is raised and distributed by conveyors along the length of the storage, or it is raised 20 feet and taken across the alley and distributed in bins above the furnaces. From the latter place it is fed by chutes to the furnaces. These bins have 400 tons capacity. Of course arrangements are made for conveying from the

The station is located on the Chicago river and jet condensers are employed. There are four 1,000 horse-power cross compound condensing engines with 24 and 40 by 48 inch cylinders. They are direct connected to Siemens & Halske generators. The armatures of these machines revolve outside the fields. The weight of the armatures is 12 tons each. The fly wheel is 20 feet in diameter. The piping is of course arranged to run the engines condensing or non-condensing and to run high pressure in both engine cylinders in emergency cases. The stack is 14 feet square inside and 200 feet high. As the Chicago river is a navigable stream at this point the feeders running east had to be put through a tunnel under the river. This tunnel is 12 feet high, 6 feet wide and 289 feet long. The feeders enter it through vertical shafts at each end. Feeders going south and west leave the station on enormously heavy overhead lines. The switchboard panels are the General Electric Company's standard railway type. The generator board is on the main floor, and the feeder board of 40 panels on a gallery. A 20 ton Walker hand power crane travels the length of the engine room. An automatic oiling system is used whereby the oil is forced to the bearings on the various machines by compressed air. One valve controls all the oil cups on a unit. Compressed air is also used for cleaning armatures and switchboard. Air pumps made by the Crane Company of Chicago furnish the supply. A 140 horse-power engine and generator are being installed to light the station and car barns and possibly to pull owl cars. It will sometimes happen that during the rush hours in the evening when a storm is on in winter that all the generator circuit breakers will open, leaving the station in darkness when light is most wanted. The small engine will overcome this trouble.



MURPHY FURNACES—CALIFORNIA AVENUE.

storage to the boiler room bins. The whole set of conveyors is run by a 40-horse-power electric motor. The capacity of the conveying system is 40 tons per hour. The Harrison noiseless conveyor is used.

To feed the boilers Admiralty feed pumps are supplemented with Metropolitan injectors and exhaust feed water heaters. All steam piping is under the floor and Westinghouse steam loops act as separators to return to the boilers water condensed in the steam piping.

MILWAUKEE RECEIVERSHIP TO END.

Henry C. Payne is reported to have said that the receivership of the Milwaukee Street Railway will end in sixty days, if business continues to be as good as the last three months. He said:

"During the last three months the increase in the business of the road has been something enormous, especially on the lines to the public parks. This increase I attribute to the general improvement in business conditions and to the improvement and attractions at the public parks. During the receivership we have expended \$80,000 in improving and extending the road. Notwithstanding this outlay the road is in good financial condition and is making money."

TRANSPORTATION AMUSEMENTS AT ATLANTA.

The transportation amusements at the Atlanta exposition will include the scenic railway, shooting the chutes, electric launches, gondolas, Rocky Mountain ponies, and a revolving passenger wheel.

THE BALTIMORE TUNNEL.

The Review Discovers the Cause of the Alleged Failure of the Overhead System.

The REVIEW has had its special correspondent in Baltimore closely watching the electric installation in the tunnel from the very start. Recently conflicting reports have gone out through the daily papers that the system was far from successful. The cause of these adverse reports appears to arise from petty jealousy between some of the electrical engineers who should have been in better business than attempted throat-cutting. The instance is, unfortunately, by no means a rare one, but the inside glimpse is amusing.

The experimental stages of the electrical departure in the Belt Railroad tunnel in Baltimore were watched with keen interest. It was so much of an experiment that the officials of the General Electric Company, who installed the work, jealously guarded their secrets. Fortunately, the REVIEW man came into such close contact with their movements, that we can speak with some confidence of the condition of affairs, which led to the reports of trouble with the overhead work of the electrical equipment.

Our correspondent has watched the progress of the work almost every day since the first trials of the locomotive. He says: "Soon after the opening it was found that scale had accumulated and gave great trouble as the tunnel is one of the wet, slimy, oozing kind. As it is a double-track tunnel, the cost of cleaning several miles of trough by manual labor was considered too great, and the electricians adhered to the continued use of a stronger electric current, and the trolley to burn out and wear out the accumulation of slime, or scale. This plan succeeded. But right here I must introduce an incident. Two of the young electrical engineers of the General Company are at odds. One, who had been engaged on this work in Baltimore many months, was an aspirant to the appointment of superintendent at the power station, which furnishes the power for the service. Another engineer, and a keen one, too, came to Baltimore later, and is the chief aide to the supervising engineer.

"The second arrival laid his lines for the superintendency also, but the other man was on the ground first, and his claim was rooted. At the same time, he resented the interference with his plans, and talked rather hotly about his competitor, whose work was mainly with the locomotive and tunnel work. While in this mood, he is quoted as saying that the tunnel could not be used for several months on account of the scale in the overhead trough. As a matter of fact, the electric locomotive has been running since the time it was put together. This shows a motive for incorrect reports which were circulated at and since the experimental stages of the undertaking.

"Some slight mechanical defects were also encountered at the time of the first experiments, such as the suspension of the overhead trough, which is regulated somewhat on the principle of a suspension bridge. This had

to be lowered and adjusted in some places. Persons who saw the peculiar flexible trolley arm fall from the trough, would have easily been led to suppose that the device was a failure, but all defects of this or a similar kind apparently have been remedied and I can find at this writing no evidence that any trouble is experienced with the overhead work.

"In view of your request for information upon this subject I made a special point of having the overhead work watched, and examined at a trial for high speed made this morning. Owing to other engagements, I was unable to make the trip, but I had a very competent man on board of the locomotive. Of course his particular mission was not known to those on board. His report to me substantiates the statement that the overhead work, as planned and constructed, is giving satisfactory results. The trial for speed developed a rate of sixty-one miles an hour without any trouble from the overhead trough or flexible trolley.

"Entrance was made at the south portal at a speed of 20 miles an hour only, on account of switches and the curve, but this speed was quickly increased. The locomotive ran with perfect ease and steady motion, more like gliding than running. The instruments recorded a speed of 61 miles an hour for part of the run, and as it was made on the heavy up grade was pronounced fully equal to 75 miles an hour on level straight track. The locomotive used was No. 1, which was not designed for fast work, and has been in actual service ever since August 4. An interesting feature of the run was the success of the extension trolley, adapting itself to the various irregularities of the overhead work which at some points is much higher than at others, or turns to one side or the other.

"Another cause of unfavorable reports was probably due to the feeling of Baltimore & Ohio officials that they did not want the name of their company attached to this enterprise until its success was assured. This feeling coupled with the reticence of the General Electric Company officials, naturally created a suspicion that everything was not working satisfactorily. Subsequent successes have removed such fears, and there is no indication that any change will be made in the overhead equipment."

REORGANIZATION AT DAVENPORT.

Creditors of the Davenport & Rock Island Railway Company have taken possession and have organized the Tri-City Railway Company with \$600,000 capital, which will succeed the old company. The creditors hold \$420,000 of the stock, while the remaining \$180,000 will be placed upon the market, the proceeds being used to settle all accounts for paving and supplies and, in fact, all debts except the mortgage. The management of the company will not be changed. The officers are D. H. Louderback, president; J. C. Shaffer, vice-president; J. F. Lardner, secretary and treasurer; directors: John J. Mitchell, Clarence Buckingham, Wilber C. Wait.

A BUSY BOILER MAN.

Frederick E. Bruce, manager of the New York office of the National Water Tube Boiler Company, is one of the busy men of that busy city, and pushes business with a high pressure. He was born at Cleveland, in 1862,



FREDERICK E. BRUCE.

and after leaving the city schools finished his collegiate course at that excellent educational institution, the Western Reserve College. For the past twelve years he has been connected with some of the largest manufacturing concerns, and managed the Cleveland office for the Ohio district of the Sterling Boiler

Company for the past few years. In July last he moved to New York to accept his present position. During his boiler career he has installed some of the largest steam plants in the country and his record assures success in his new position. Street railway men will hear from him from now on and will find in Mr. Bruce an agreeable gentleman and well informed business man.

RAISING THE JULY 4TH RECORD.

Our mention last month of the excellent Fourth of July record at St. Joe, Mich., brings out a still better one. E. E. Downs, general manager of the Citizens Street Railway, at Battle Creek, Mich., collected on his road, on that day 15,721 fares; or an average of 1,572 fares for each of his ten cars. This immense business was handled without interruption or accident of any kind.

Another record to be proud of is reported by J. R. Wheaton, manager of the Consolidated at Butte, Mont. On July 4th, with 10 motor cars three of which hauled trailers, he carried 17,171 fares averaging $6\frac{1}{4}$ cents a fare; a total of \$1,073.19, or \$107.31 per car. This was done with 16 foot Stephenson cars equipped with old style Sprague double reduction motors. When the earnings approach one hundred dollars a car, it may honestly be said to be the conductor's busy day, and when the car is as small as in this case we can well imagine the money changer to be the most active man in his town.

Terre Haute has a population of 40,000, but on the Fourth of July Russell B. Harrison's road carried 45,000 passengers or an equivalent of more than one round trip for half the population of the city, and they were well served, too.

HANDLED BIG CROWDS.

C. S. Sergeant, general manager of the West End Street Railway Company, Boston, received many warm words of praise from a large number of street railway men who visited Boston during the Knights Templar conclave, and who could appreciate the difficulties he overcame in giving such perfect service, under extremely disadvantageous circumstances. The thousands of people who visited Boston were also loud in their praises of the manner in which cars were kept constantly running, although they could not appreciate the genius that had planned out before hand just how it was to be done. The cars were kept constantly moving, and in the downtown district they were almost touching each other, so that for blocks it seemed as if there was one big car a mile long on the tracks, yet foot passengers and vehicles had no difficulty in crossing the streets.

Mr. Sergeant had demonstrated his great ability as a railway manager long before the conclave, but the manner in which he solved the problems in front of him, conclave week, showed that he possesses the qualifications of a great general, and he should feel particularly proud of the way he was able to handle the unprecedentedly large crowd of the Knights Templar parade. This was peculiarly difficult because of the enormous number of persons who came into the city early, and of the fact that nearly all of the lines of the company were roped off for the parade during nearly the greater part of the day. It was necessary, therefore, to so time cars that at the proper moment the streets which were to be occupied by the parade should be cleared, and still further that the company should be prepared to render a service all day from the suburbs to the furthest point in town to which it could go without interference with the parade, and to be ready as rapidly as the streets should be opened after the parade to put in a large number of cars to convey the people home. The further precaution, was taken, which was perhaps unnecessary, of cutting off the current from all the overhead lines over the procession, doing this some blocks in advance and as the procession moved, and turning the current on promptly afterwards so that the traffic should not be impeded for lack of current.

During the day, and in fact during the entire week, there were no serious accidents, and practically no delays arising from any failure of power, line or apparatus on the cars. The enormous number of foot passengers in the street made the movement of cars much slower than usual, but that was unavoidable in a city like Boston. On all main lines of traffic which were obstructed portable cross-overs were put in on the outside of the parade, and in some instances on the inside of the parade, so that the service was kept continually running throughout the day, although the company was deprived of the service on the main thoroughfares, Washington and Tremont streets, down town, from 10 a. m. until 6:20 p. m. Notwithstanding this, however, the number of passengers carried on that day exceeded any previous day in the

history of the company. The maximum number of cars on the wire was 1027, and the heaviest load on the power stations for the heaviest hour of the day was 15,850 amperes. This load is much lighter than would be expected were it not that the majority of the cars were equipped with only one motor.

There was scarcely the pause of an instant in the movement of the long lines of cars on the lower portions of Tremont and Washington streets, which are the two main thoroughfares down town. The employes, especially the motormen used great care, and pedestrians, cab-drivers and motormen all seemed to have intuitive knowledge of what each was going to do. The cars nearest crossings would pause a moment, and a dozen people and a cab or two would rush across. Although apparently great chances were taken, nobody was hurt, nor was a vehicle even scratched. When the people had crossed the car would move on again followed by those behind it. The motormen would hardly get the current on before they would shut her off, the style of controller on open cars being the old T-H rehostat, but the cars were kept moving. Uptown the cars were able to make better speed.

The entire system of the West End Street Railway Company is covered by inspectors, who are the aids of the division superintendent, and whose duty it is to keep everything moving, and report by telephones, which are stationed all around the road, at stated times where they are and any incidents of moment. In this way not only the division superintendent, but the general office is kept always posted of all incidents and accidents of the day's traffic, and within a very few minutes after their occurrence. The time tables which are being run, if found to be inadequate by the inspectors on the street, are re-inforced by cars ordered by telephone for any particular crowds at railroad stations, wharves or otherwise.

The company had also to run during Knights Templar week, and particularly during the day of the parade, a very large number of chartered cars for different commanderies, and this service was performed to the general satisfaction of the patrons.

So complete were the arrangements for handling cars during the parade, that orders were issued several days before it occurred, so that every official and employe knew just exactly what he was to do. This was a marvelous piece of work, as it was not only perfect in theory, but was carried out to the merest detail in practice, and without a hitch. The system is operated in nine divisions, in all but two of which there were changes in all lines; in the 4th and 8th divisions no changes were necessary. Following is the schedule of division 3:

Cross Town to Tremont House, last trip through 8:04, then to cor. Washington and Northampton streets.; Milton to Franklin street, via Federal street, last trip through 9:30. Commencing at 10 o'clock, will return via Summer and Chauncey streets, and Harrison avenue to Broadway Extension until after the parade; Neponset to Franklin street, commencing with the 9:41 car, will return as above; Neponset to Union Station, last trip through 8:30, then 8:50 regular route in, returning via Summer street, Chauncey street, and Harrison avenue to Hampden street, then to Summer street, and depots via Harrison avenue, until shut off by parade: Park street to Union Station via

Post Office Square, last trip through 9:32, returning via Harrison avenue and Broadway extension, then run to Summer street and Depots via Broadway extension, Harrison avenue and Summer street, until stopped by the parade.

MOTORMAN STRUCK BY LIGHTNING.

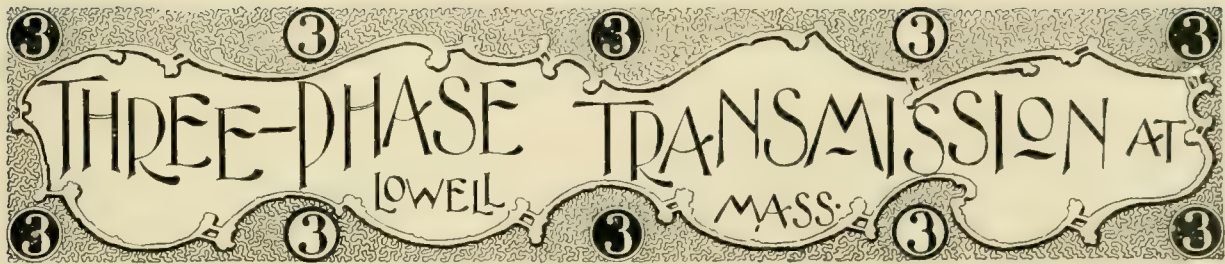
One of the few cases on record of a motorman receiving a shock from lightning when operating an electric car occurred at Leavenworth August 19. Motorman James Melvin of the Leavenworth Electric Railway, who was the recipient of the shock, was at the time at his post on a vestibuled motor car. The night was very dark and a violent thunderstorm was over the city. The flashes of lightning were blinding to all who were out and especially to motormen. Melvin had his head out of the window of the vestibule trying to see ahead in the intense darkness when the bolt struck him. He had on rubber boots and his hand was on the brake handle. The bolt passed through his head and down his right arm to the brake handle. He was not seriously injured, but was knocked back through the open door of the car about six feet. He recovered almost fully within half an hour, and the next day experienced no bad effects from the shock. The lightning bolt which struck Melvin seems to have been part of a heavy discharge which manifested itself in several places at once, and was remarked on by several. A motor on another car was disabled at the same time, and for several seconds after the discharge blue balls of fire rolled along the track in front of the electric railway office. There is nothing in the occurrence to indicate that motormen should have any cause to fear during thunderstorms any more or as much as people not on the cars who have neither lamp circuits nor lightning arresters to protect them. The motorman is safer than the majority of people during a thunderstorm.

WANTS WATER PIPE DAMAGES.

The Farmers' Loan & Trust Company, New York, holding bonds of the Omaha Water Company for \$400,000, and E. L. Bierbower and A. B. Hunt, receivers, have begun suit against the Omaha Street Railway Company for \$250,000 damages to its water pipes by vagrant electricity. The water company says it has already expended a large sum in replacing mains ruined by electric currents and is compelled to replace many more. As a knock-out blow the court is asked to compel the street railway to remove the cause and stop its dynamos.

The Middle River & Sparrows Point Electric Railway Company, Baltimore, has made extensive improvements at Fairy Grove. Two naphtha launches have been put on the river, shooting galleries and bowling alleys built, ball grounds laid out and other amusements added, among them a steam riding gallery, built by the Armitage-Herschell Company, North Tonawanda, N. Y.

Paris is talking of an elevated electric railway.



THREE-PHASE TRANSMISSION AT LOWELL MASS.

Lowell, Mass., will go down in history as the first city in the world to place in operation long distance three-phase transmission on an electric railway from a central steam plant. Since July 20 this system has been in use on the Lowell and Suburban Street Railway, of which P. F. Sullivan is general manager. There yet remains to be installed another sub-station to supply the Nashua line, which will be working this fall. The Nashua line was a horse line that was bought by the Lowell & Suburban and is being converted to an electric line. At present the high pressure current is transmitted 10 miles to Eayer's mills, where there is a sub-station, from which the current is sent out on the line at 550 volts. The other sub-station at Nashua will be 15 miles from the power house in Lowell.

The equipment at the power house consists of two combination direct current and three-phase General Electric generators with a speed of 900 revolutions, rated at 218 amperes continuous current with 500 volts at no load and 550 volts at full load. They will do 50 per cent more. The armatures furnish direct current from one commutator and three-phase from the other. The direct current excites the fields, and may also be used to supply power direct to the trolley. The three-phase current as it leaves the generators has a voltage of 365, and is conducted down stairs to step up transformers, where it is raised to 5,475 volts. It is transmitted nearly 10 miles to a sub-station at Eayer's mills, where there is a tap, and step down transformers reduce it to 365 volts, the same pressure at which it leaves the generators. It is next fed into rotary transformers, which give a voltage of 550 volts direct current to a section of the trolley line, which runs back five miles to Lakeside to meet the end of the trolley line which is supplied direct from the power station and five miles further towards Nashua.

The 12 step up transformers at the power house are set on a platform in the basement, and are ventilated by means of a blower driven by a 2-horse-power motor through funnels under each transformer. A transformer is used for each leg of the circuit. At each sub-station there will be 6 step down transformers, and two rotary transformers. The rotary transformers are like the generators at the power station, except that they are not compound wound. There is a 4-panel switchboard at each sub-station. Only two men are required at sub-stations—one man each watch.

The switchboard had to be specially built by the General Electric Company. When completed it will be 54 feet 4 inches long, and 7 feet 2 inches high, of 28 panels,

each weighing 500 pounds exclusive of base. There are four panels for each three-phase unit, all independent and all work together. The others are for the direct current units. There is a T.-H. ammeter on one leg, a volt meter on the board and an ammeter in the exciting circuit. Plugs are used to throw in the phase lamps, and to throw the machines in sympathy or synchronism before they are thrown in circuit. The three main circuit breakers open at 200 amperes, and the two equalizing switches at 100 amperes. There are two small switches for the exciter and a Carpenter rheostat. In addition to the four panels for the alternating side there are three panels for the direct side of the generator. Each machine has a panel with four phase lamps and the usual instruments. Two machines are always used in starting.

The step up board has twelve 5,000-volt switches in rubber bushings, one for each transformer. Three transformers or a multiple of three must be used all the time. At present six are in use. The 5,000-volt switches on the transformer boards are set out on plugs. The high pressure current is transmitted by three Washburn-Moen 00 rubber covered cables and shows a drop on line of less than 3 per cent with 25 amperes on the high tension side. A special glass insulator was designed which resembles an inverted champagne glass, on the stem of which rests an ordinary insulator. The top has a groove in which the cable rests. In spite of the fact that tree insulators were used, several trees have been burned, in one case a tree 17 inches in diameter having been burned through. Although it was known what the trouble was nobody cared to go out on the line to remedy it. The system is being installed by the General Electric Company under the supervision of P. F. Sullivan, general manager, and G. B. Damon, electrician of the Lowell & Suburban Street Railway Company.

The equipment of the power house consists of four 500-kilowatt General Electric generators, exclusive of the four three-phase generators, and three 500-horse-power and one 200-horse-power C. & G. Cooper, Mt. Vernon, Corliss engines, and 6 tubular boilers of local manufacture.

Liverpool's elevated electric railway during the past half year carried 600,000 more passengers than in the previous half year. Not only did the number of passengers increase, but the revenue per individual also, from 1.65 d. to 1.92 d.; a gain of a half cent per passenger. Dividends of 5 per cent per annum on the preferred and 2¼ per cent on the common stock have been declared.

FRANCIS M. BERNARDIN.

After an experience of six years in purchasing street railway supplies, Francis M. Bernardin has gone into the supply business for himself at Kansas City. His long service as a purchasing agent will place him in position



FRANCIS M. BERNARDIN.

to serve his patrons with what he has found to give the most satisfaction. Mr. Bernardin and a twin brother were born at Ft. Scott, Kan., April 26, 1868, and received his education in the schools of that city and of St. Louis. In 1885 he entered steam railroad work by becoming a clerk in the local freight office of the Kansas City, Ft. Scott & Memphis Railroad at Ft. Scott, under R. J. McCarty. In 1886, Mr. McCarty

was called to Kansas City to take the position of secretary and auditor of the Metropolitan Street Railway Company, which had just been organized to purchase all the franchises and property of the old Corrigan Consolidated Street Railway Company. Six months later Mr. McCarty sent for Mr. Bernardin, and gave him a position. In 1889, Mr. McCarty was made general manager and chief engineer, when Mr. Bernardin was made purchasing agent until 1892, when he was made assistant to Mr. McCarty, holding office until August, 1895, when he entered the supply business. During his connection with the company, all the old lines which originally comprised twenty-five miles, operated by animal power, were changed to cable and electric. Mr. Bernardin handles the specialties of the Ohio Brass Company, as well as heavier supplies.

CONTINUED STORAGE BATTERY FAILURE.

The most desperate attempt to make storage battery win that has ever been made is still running on the Birmingham, England, lines. The reason why the batteries are retained so long after their admitted failure is understood to be due to the fact that the leading owners in the battery company are also prominent in the railway company.

The London Electrical Review on August 30, 1895, prints the following:

One of the directors, Mr. T. J. Mantle, addressing the shareholders the other day, said that "he had come to the conclusion that so long as they worked this line by electricity on the accumulator system, so long would they have a millstone round their necks which would drag them to the ground." The chairman, in his remarks, had previously stated that on the electric section they had

run 138,925 miles, a decrease of 198; carried 1,154,345 passengers, a decrease of 149,488; and earned £9,093, a decrease of £641. This was a very sad state of things, and the line showed, instead of a profit, a loss of £1,735, 12s. 8d.

STORAGE BOBS UP AGAIN.

The storage battery for street cars, like Banquo's ghost, will not down. It does not seem to know when it is buckled. There was a time when street railway men counted expectantly on the adoption of jars of grids to operate their cars. That was a long time ago, as time goes, electrically. Hundreds of thousands of dollars were disintegrated in the ineffectual effort to do something besides lose money. In proportion to its size the Panama canal was not a circumstance. After a while managers came to their right mind, and built trolley lines, gave good service and made money. Theoretically the storage bat was the one thing needful; practically it was the one thing of absolute failure. An attempt is making by the Electric Storage Battery Company, of Philadelphia, to revive the corpse, and the effort will soon be made on the horse lines of the Madison Avenue road New York. While storage is an excellent thing in its place, and works nicely for train and house lighting, running phonographs and sewing machines, it cannot hope to enter a service so severe and sudden as that of operating a car where the light plates are subjected to constant jar. It is no comparison at all to quote the storage on small pleasure boats. The service is no more like a street car than a wind mill is like a steam engine. Some fairly good work has been done with storage in central stations, but only one or two of the 500 electric roads have ever found it a desirable or profitable addition to their plants. Now that so much is said about horseless vehicles it might not be inappropriate to try the storage on a hearse, where the load, although a dead weight, is absolutely uniform, and high speed not essential.

In the Electrical Journal William A. Anthony very pointedly reviews the case as follows:

First—The cost of the central station plant for charging batteries would not be much different from that of a plant to run the cars direct. The plant could be somewhat smaller, if batteries enough were furnished, so that the exhausted batteries could be allowed to accumulate during the busy hours, to be charged and stored ready for use when the traffic was light. But such an excess of batteries would cost more than the plant it would save.

Second—Each car must be supplied with motors and controlling devices, precisely as though it were to be driven direct from the central station.

Third—There is the cost of the storage battery equipment to offset the saving in line, and, perhaps, subway. Which of these would be the greater would depend upon the conditions in the given case.

Fourth—The loss of energy would not differ greatly for the two modes of propulsion. For short lines the loss would be against the battery.

Fifth—The cost of maintenance of a storage battery would be much greater than a well constructed line.

Without comparing figures it would seem, as an off-hand guess, that the conditions would need to be all favorable to the storage battery, in order that it might prove its superiority, even to an underground trolley, from a commercial standpoint, upon lines of ordinary length and ordinary density of traffic.

It is stated that the battery now to be tried for street car service has already passed the experimental stage, and is a success in Paris. Granting this, it must not be forgotten that Paris is not New York.

WILL NOT DOUBLE FARES.

Considerable grumbling has been caused by the report that the Atlanta Consolidated will double its rate of fare during the exposition. There has been a misunderstanding as will be seen by the following letter from President Joel Hurt:

"It is not true that the fares on all the lines of the company throughout the city will be doubled during the exposition, but that, on the contrary, the service as now furnished on all the lines will be continued at the same rate of fare as now charged, but there will be changes made in the cross-town or through lines. Cars on all of these lines will be operated into the center of the city and out to the exposition terminus for one charge of ten cents, instead of having passengers make changes in the center of the city, as heretofore, and paying two fares of 5 cents each to the same point. There will be operated from the center of the city into the exposition terminus special cars upon which a charge of 10 cents will be made, but passengers can make a continuous trip on any car between any two points in the city between which cars are operated for one fare of 5 cents."

ELECTRIC HEATER MEN JOYFUL.

The electric heater men are feasting on brown bread and beans these days in honor of the order issued by the board of railroad commissioners of Massachusetts. The notice, which has been sent to all the street railways in the state, is as follows:

1. The several street railway companies shall equip such electric box cars as are used by them for the transportation of passengers in the months of November, December, January, February or March in each year, with suitable apparatus for heating the same by electricity; provided, that other than electric heaters may continue to be used in such cars as are now equipped therewith until the further order of the board.

2. Electric box cars, while in use for the purpose and during the months aforesaid, shall, whenever the outside temperature is less than 50 degrees above zero (Fahrenheit), be kept warmed by such electric or other heaters to an inside temperature (as near as may be) of not less than 50 nor more than 60 degrees above zero; except at times when the company is temporarily prevented from

so doing by storms, accident, or other controlling emergency.

3. These regulations shall take effect on the first day of November, 1895; and may be modified from time to time in general or in particular as experience and the public comfort may seem to the board to require.

NEW ORLEANS SCANDAL.

New Orleans, which usually takes life in an easy enjoyable fashion is all torn up over the indictment, or rather nine indictments against Maurice J. Hart, who is one of the most prominent men in the city. Mr. Hart commenced with little in the seventies, in the loan office of Judah Hart, but constantly pushed himself to the front, taking the initiative in all public improvements, until for the past ten years he has absolutely controlled the city council, though not a member of that body. It is said no ordinance could pass the council without his consent, and also that his consent came high; so high, he is reputed to have cleaned up two or three million dollars in the past ten years. The Rosseta Grave Company, which enjoyed a monopoly and which has made several hundred thousands of dollars, was his conception. Mr. Hart also fathered the scheme for placing all electric wires in the business districts on towers 100 feet high connected by a suspended walk. This strange æriel walk-way never fails to excite astonishment in the minds of strangers, but as a financial venture was a failure, as the promoters did not succeed in sandbagging the telegraph, telephone, etc. companies to any extent.

The charge against Hart which will most interest our readers is that growing out of the payment of \$37,500 to 20 members of the city council for passage of an ordinance extending the franchise of the New Orleans City & Lake Railway. Additional larger sums are understood to have been received by Hart for working the deal. Also large sums for the passage of the Judah Hart and Crescent City franchises.

The grand jury are pushing matters vigorously. Already one alderman is wearing the stripes; two more are under sentence and a lot more waiting their turn. Hart has been one of the most progressive men in the city, but has made no secret of the fact that he was not working for fun alone. Whether his natural ability and immense wealth will save him this time remains to be seen.

FROM THE ISLES OF THE SEA.

From Dunedin, New Zealand, Henderson Law, general manager of the Mornington Cable Tramway sends us a copy of his annual report, which shows a good business carried at a good profit. A dividend of 7 per cent on the capital stock was declared after placing a nice sum to the credit of the surplus account. During the year 57,793 car miles were run, carrying 514,281 passengers. The line has a gradient of over 16 per cent and uses Cradock cables which last over three years. H. Shrimpton was elected auditor to succeed R. H. Leary, deceased.

AN EXPERIMENTAL STUDY IN BELT LACING.

We are indebted to the "American Machinist" for the illustration and following interesting article on belt lacing which is well worth the careful study of all belt users. The article is by Walter Flint, M. E., of the Maine State College, Orono, Me.

Every one who has had the care of belting has always had a decided preference for some particular form of lacing; and no doubt has ever existed in his mind that it was the best.

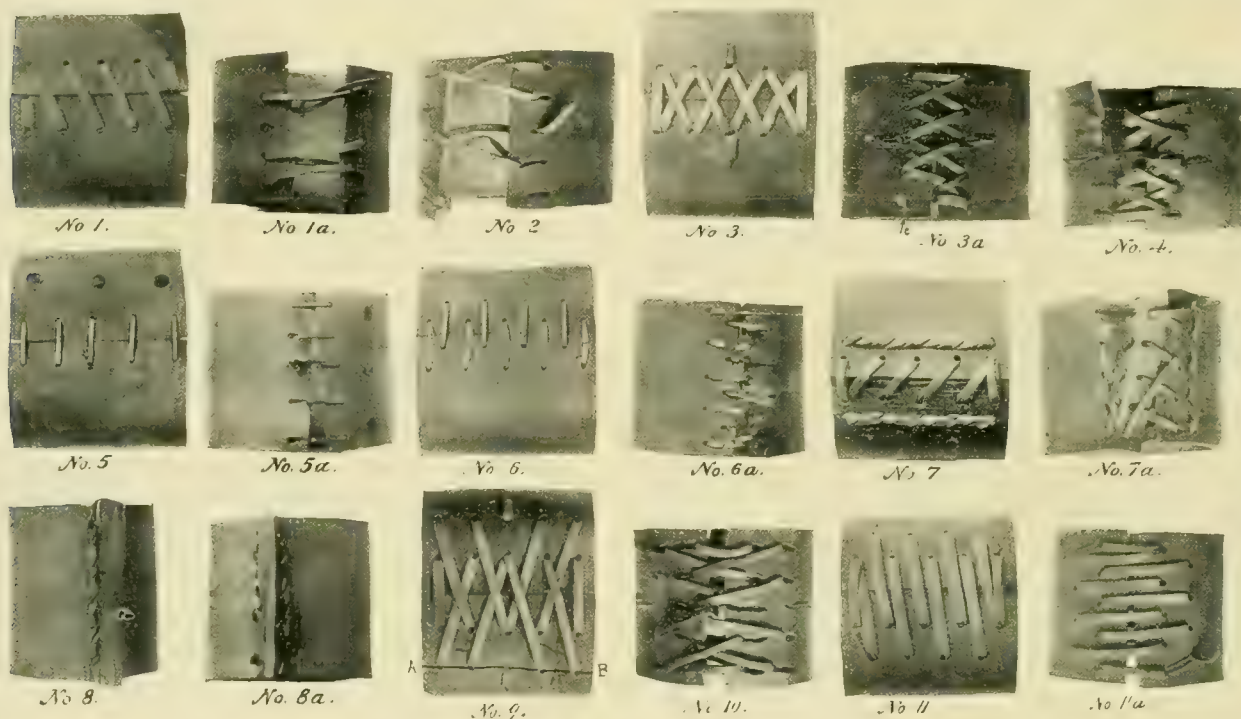
It is the object of this paper to demonstrate so far as possible, which of the most common joints is the strongest, the question of wear not being considered.

Another point to be determined is the efficiency of the

constructed that the belt was free to move as though it were on pulleys, thus equalizing the strain in that direction. It was then held in the testing machine by hooks, which allowed it stretch more on one side than the other if it wanted to. This latter condition is not strictly true of a belt on pulleys, but considering the very short length of the samples it was thought best to have it so.

The form of this joint is plainly shown in cut No. 1 and No. 1a shows the break. The belt was not injured. The lace broke in the middle first and then on the edge. The joint failed under a tension of 1,150 pounds. Since the net section should hold about 2,065 pounds, it is clear that more lacing should be put in.

No. 2 is the same form of joint as No. 1, except that the holes were made with an awl. It was not thought worth while to photograph this one before testing. It



EXPERIMENTAL STUDY IN BELT LACING.

round punched holes compared with the narrow slit cut with a belt awl. It is claimed by many practical men that holes made with the awl are better, because none of the leather is removed. Good reasons for doubting this theory have appeared, but no actual proof has been presented.

In making these tests, 4-inch belting was selected and laced thoroughly with $\frac{1}{4}$ -inch lacing, well stretched. Five holes were punched $\frac{3}{4}$ inch from the end for a single row of holes, and for a double row of holes the second row was $1\frac{1}{2}$ inches from the end. The punched holes were $\frac{3}{16}$ inch diameter. These five holes removed $\frac{1}{8}$ inch from the width of the belt. The belt being 4 inches wide, the net section is about 76 per cent of the solid belt while in the cases where the holes were cut with an awl, the net section is theoretically about the same as the solid belt.

The apparatus for holding the specimens was so con-

will be noticed that the lace cut the belt from the holes in various directions. The lace did not fail till after the belt failed on the lower side. The joint failed at 790 pounds and the form of the break shows that the failure was due to the form of holes rather than weakness of belt.

Nos. 3 and 3a have the same number of holes and punched same as No. 1, but double laced, as shown in cut No. 3. The break is shown in cut No. 3a, at c. The lace was not broken. Tension applied, 1,460 pounds.

No. 4 is exactly the same as No. 2, except that it was double laced as No. 3. Tension applied, 1,335 pounds. It failed by the lace cutting through the belt. Shape of holes was cause of failure. The lace was not injured. These tests would seem to show that holes cut with an awl are far inferior to punched holes.

No. 5 and 5a was a trial of one of the metallic fastenings. The fastenings being 1 inch long, the holes had to be made $\frac{1}{2}$ inch from the end of belt. No. 5a shows the

broken joint. Tension applied, 725 pounds. Two of the hooks broke, one straightened out, one pulled through the belt and one remained sound, thus showing failure of both belt and fastenings.

No. 6 and 6a are the same as No. 5, except that by staggering the holes four more hooks were put in. No. 6a shows the broken joint which failed under a tension of 1,480 pounds. Both belt and fastenings failed.

Cut No. 7 shows this form of joint. Holes punched. The break is shown in 7a, and took place 1,510 pounds. The lace failed in one place, while the belt failed generally.

No. 8 and 8a show what is known as the "boot leg" lacing, and is a great favorite in eastern Maine, because of its durability. Of course, it cannot be used with a tightener nor in many other places. No. 8a shows the break which occurred in the lace; the belt itself had started to tear in several places on the inside. Tension applied, 1,310 pounds.

No. 9 is a double-laced joint with only one strand in each hole. Holes punched. The negative of the broken specimen was lost, but the break occurred along the line AB. The lace was not injured. As near as could be observed the break was simultaneous along AB. Tension applied, 2,015 pounds. The net section of belt should have held about 2,065 pounds. This would seem to show that that nothing further can be obtained when five $\frac{3}{16}$ inch holes are used, since the lace held more than the belt.

No. 10 is the same as No. 9, except that holes were cut with an awl. It was thought since No. 9 failed on account of too small a net section, that making holes with an awl might possibly help matters. The cut shows the result. The lace was not injured. Tension applied, 1,590 pounds.

No. 11 is peculiar in that the holes are staggered, one strand in each hole, and strands not crossing on either side. There appears to be no reason why it should not hold as much as No. 9. The lace was evidently faulty, since the holes did not appear particularly strained. No. 11a shows the broken lace on the lower side. Tension applied, 1,835. This comes nearest to No. 9 in strength.

LARGEST WIRE ROPE EVER MADE.

If the various would-be presidential candidates only had the pull of the big cable manufactured by the Hazard Manufacturing Company, Wilkes Barre, Pa.; they would be all right. The rope, which is said to be the largest ever made is 37,100 feet long, and when wound on a spool for shipment, makes a nice little roll 10 feet in diameter and 11 feet long. It weighs 150,000 pounds and for its shipment a special car was built, with two 8-wheel trucks. The rope is 1½-inches diameter, and goes to the Columbus avenue cable line, New York. A second rope of same size is now being made.

J. Gust Zook has been appointed general manager of the Pennsylvania Traction Company, Lancaster, Pa.

DEPLORABLE MANAGEMENT.

Several times have we called attention to the waste of time and money by long waits at termini. We are again forcibly reminded of this by a recent visit to an eastern road where six lines centre in the business part of town, and both here and at other end of the six lines each car has a laying time of ten minutes. Out of consideration to the manager we withhold the identity of the road. What the loss to the company is can readily be imagined from the practice on one of these lines, which is only a little over two miles in length. Three cars are in service, making the round trip every hour. Twenty minutes are consumed each way and a ten minute lay over at each end. As two men are used on each car there is a waste of one-third the time of two men. Assuming their wages to be only \$1.50 each per day, or \$3 per day per car, each car loses one dollar's worth of wages daily. Three cars one year thus lose \$1,095, which is 6 per cent interest on \$18,000. As the power plant would be to but slight increase in expense were the cars running all the time, it will be seen that a betterment of the car service by 33 per cent would certainly effect some increase in earnings, and that increase would be nearly all clear profit. On the other five lines more cars are run, but were there only the same equipment of three cars on each the total loss of time amounts to \$18 per day, or interest on \$108,000.

Plainly, what the road should do is one of two things. Abolish the lay-over time, which being one-third would enable exactly the same frequency of service with two cars where there are now three. This would save \$3 per day on each line, or \$18 per day on the system; or, abolish the lay over and so increase the car service, and take the increased earnings which can naturally be counted on. For the morning and evening rush, run trailers either with or without an "extra," conductor who is paid by the trip or hour. The money going to waste on this road would, if saved as it should be, largely increase its dividends—if indeed it pays any at all—and all without impairing in the slightest degree the efficiency of the service and the present facilities furnished the public.

A rolling stone may not gather much moss, but a dead car earns no fares. Keep the rails bright.

SUES FOR THE THIRD RAIL.

An unexpected suit has been brought by the Siemens-Halske Company of America against the Metropolitan elevated electric of this city, claiming patent on the use of the "third" rail for transmission of current to cars. The patent was issued several years ago to Ernest Werner Von Siemens and is now owned by the Siemens-Halske Company. It is really a fight between that company and the General Electric which made the Metropolitan installation, and is under guarantee to protect all its work. The General Electric claims a patent on its use of the third rail so that the suit simmers down to a locking of horns of the two big, rival electric companies.

THE BEST ROUTE TO MONTREAL.

By all odds the best route to Montreal convention from the west is via the Lake Shore & Michigan Southern Railway, with which arrangements have been made for special cars; and if, as now seems likely, practically the entire western delegations go this way, then the train will be run as a special exclusively for the party.

In any event special cars will be reserved. A special passenger agent will be detailed to accompany the party all the way through and look after their comfort. It is not necessary for us to speak of the superb accommodation which the Lake Shore has placed at the disposal of the party, in the way of elegant sleepers and dining cars, reading room, buffet, etc., etc.

The train will make up at Chicago, passing through Toledo, Cleveland, Ashtabula, Erie, Dunkirk, Buffalo, Rochester and Syracuse. At Utica the train turns north for a daylight ride through the Adirondack mountains, conceded to be one of the most picturesque and beautiful trips on the continent. The autumn foliage will present a panorama of color and the scenery alone is well worth the trip to Montreal.

As the convention has been set to open a day earlier than usual, commencing Tuesday morning, October 15th, it will be necessary to leave Chicago Sunday morning at 10:30 o'clock, arriving at Toledo at 4:45 p.m.; Cleveland, 7:35; Ashtabula, 8:54; Erie, 9:54; Dunkirk, 10:01; Buffalo, 12:10; Rochester, 3 a.m., and Syracuse, 5 a.m. Cars will run through to Montreal without change. Delegates desiring to leave any other dates should take either the 3 p.m. train, or the limited 5:30 p.m., arriving at Montreal at 10:15 p.m. the following evening. The special rate for the round trip is \$24 on the certificate plan, the sleeper \$5 each way.

Our readers are requested to advise the REVIEW at once how many will probably go from their company, as by joining this party many advantages will be had, not possible in travelling otherwise. Special cars will also be reserved for gentlemen accompanied by ladies. C. K. Wilber, W. P. A. of the Lake Shore road, Chicago, will also give any further information desired, and reservations may be sent either to him or the REVIEW. Returning delegates are at liberty to stop at Buffalo and visit the Falls.

QUEEN'S HOTEL, MONTREAL

With every room an outside room, new furniture, steam heat, excellent table, and courteous management, the Queen's Hotel, Montreal, has accommodations to suit the most fastidious. In addition it is the only fire proof hotel in Canada and it has made special rates of \$2.50 and \$3 a day for delegates and supply men who will attend the Montreal convention of the American Street Railway Association. The hotel is within two blocks of the convention and exhibit halls, a block and a half from the railroad station, and convenient to all points of interest in the quaint old city. The accommodations are first

class in every particular, which cannot be said for some of the other Montreal hotels. S. Frazer-Crieire, the manager, personally looks after the comfort of his guests.

NO 13TH NUMBER FOR US.

Not because thirteen is considered by some people as an unlucky number, but because we do not believe in the principle of the thing; does the REVIEW try to force its advertisers into something which they don't want, but for reasons of policy might not like to decline. We have always maintained that our advertisers who are with us year in and year out are entitled to the best we have, and the REVIEW never has and never will make that "best" number an extra one in which our advertisers are held up for an extra charge. Our October issue will be a handsome souvenir issue, but all our advertisers will be in it without one cent extra expense, unless they desire extra space and in that event only the regular rates are charged. Advertisers have been boned to death for all sorts of clap-trap schemes and have discovered that while continued advertising in a first-class, wide-awake publication brings good results, the most of this special-extra business is a good deal like bailing out Lake Michigan with a pint cup.

PUBLIC TROLLEY PARTIES.

Private car trolley parties have become quite well-known, but it remained for E. W. Goss, superintendent of the Middletown Street Railway Company, Middletown, Conn., to inaugurate public trolley parties. Mr. Goss says the company's line is about $4\frac{1}{2}$ miles long, divided into three divisions, which are rather short at present. As there was no park or other place of amusement to attract the people, there was not much pleasure riding. Mr. Goss concluded that he would place an open horse car at each end of an open electric, one warm night, and take the people over all the lines of the company for 10 cents. He advertised a public trolley party, which took so well that he might have filled double the number of cars had he had them ready. It proved to be such a good thing that public trolley parties are given two evenings a week. The last party had eight cars coupled together lighted with 40 incandescent lights, and had a band on board. Mr. Goss says he thinks many roads could carry on public trolley parties to their advantage. Another scheme of Mr. Goss is the issuing of a ticket during certain hours on Sundays giving, people a ride over all the lines for 10 cents.

"Bloomer cars," is the name for open cars in Providence, R. I.

A Chicago motorman, William Storey, restored a lost wallet containing \$1,600, to the owner, a Kansas stockman. The latter had been associating with hogs so long that he never thought of rewarding the honesty of the finder, or even expressing his thanks verbally.

A VETERAN STARTER.

Rare indeed are the men who have passed a half century of their lives in the employ of a street railway company. But such has been the lot of James D'Olier, the veteran starter of the Brooklyn City Railroad, who entered the employ of the old company 47 years ago.

Leaving his native heath in the Emerald Isle in 1843, Mr. D'Olier came to America a rosy-cheeked lad of seventeen. When two years later, the Montgomery Queen's line of stages was started in Brooklyn, N. Y., young James was picked out as the right man to handle the ribbons, and had the honor of driving the first stage between Bedford and the Fulton ferry behind a



JAMES D'OLIER.

pair of gayly caparisoned horses. From the box he was soon promoted to starter at the Fulton ferry. During the operation of its seven stages the Brooklyn City Railroad Company was organized and on July 4, 1854 ran the first cars over rails. These cars were of a primitive character, being simply square boxes on wheels, seating about 16 passengers and with ceiling so low a man could not stand up straight. Cars were well patronized by business people in the morning and evening, but the midday and night travel was nothing. Open cars in summer or fires in winter were not thought of and it was not till many years after that the march of improvement reached surface travel.

"The first big snow storm the company had to contend with," said Mr. D'Olier, "was on January 5, 1855. It came at night and drifted terribly over the tracks. When the members of the executive committee saw how severe the storm was they decided not to clear the tracks, for in those days the snow had to be shoveled off, snow plows and the like not being heard of. So they got out the old sleighs and ran them for about six weeks, when the weather cleared and the tracks were cleared off. They had to cut the whole mass off, as there was nothing but ice on the tracks, and it cost the company a great deal more than if they had cleared the snow off in the beginning.

"I was starter at Fulton ferry on May 17, 1870, when the executive committee of the company made me an inspector of the road, giving me the middle division, covered by the Fulton street, Greene, Putnam and Flatbush avenue lines, and for twenty-five years and three months I covered that division, till August 12, 1895, when the company put me back in my old position as starter at Fulton ferry. My duty was to see that the men did their

work right, made their time and took proper care of the passengers."

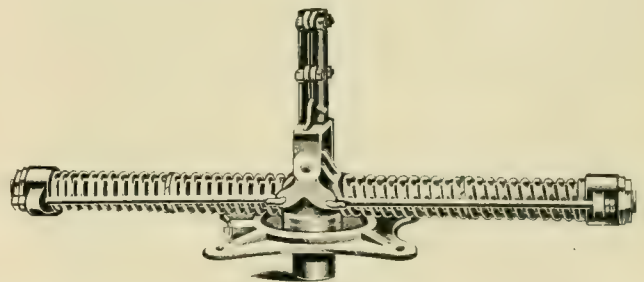
The veteran never lost a day's work until 1869, when he was given a well earned vacation. While he remained ten presidents of the company have come and gone. He has always commanded the respect of and been on good terms with the officials and his fellow employes. As starter of the swarm of electric cars leaving Fulton ferry he has ample opportunity to utilize his ripe experience. The cares of 50 years rest lightly upon Mr. D'Olier, who appears to be 20 years younger than he is, as our excellent photo-engraving will testify.

COUNTERFEITING STREET CAR TICKETS.

A bold conspiracy of ticket counterfeiters has been unearthed in St. Louis. Attention was attracted to suspicious actions of discharged employes of the Union Depot Railroad Company. A brief surveillance by city detectives resulted in the arrest of G. H. Sampson, an engraver; W. S. Dragoo, conductor; G. O. Vaughn, ex-conductor, and Ben Kaufman, ex-motorman. Sampson had several unfinished plates, acids and etching materials. One plate was a good reproduction of the Union Depot children's ticket. Dragoo and Vaughan confessed that they were to act as go-betweens, selling to conductors for 1 cent the tickets they now buy for 2½ cents of the company.

EVOLUTION OF THE NUTTALL TROLLEY.

For many years the Nuttall trolley base has held its own as one of the best and most reliable trolley bases on the market. This does not mean that no changes have been necessary in it. In fact it has been improved from time to time as practical use suggested changes and the process of evolution has been an interesting one. The



NUTTALL TROLLEY.

demands made on a trolley by different roads vary considerably. Sometimes the pole stands up nearly vertical and at other times is brought down so as to nearly touch the car roof, as when passing under bridges. The trolleys were first made with chains and were adjusted with bolts. The chains were found to break. Side rods were introduced and it was found that jam nuts at the end of the spring pipe would be an improvement in connection with nuts on the side rods. The next step in advance was the introduction of springs which were 18 inches long. Here a difficulty was encountered because it was

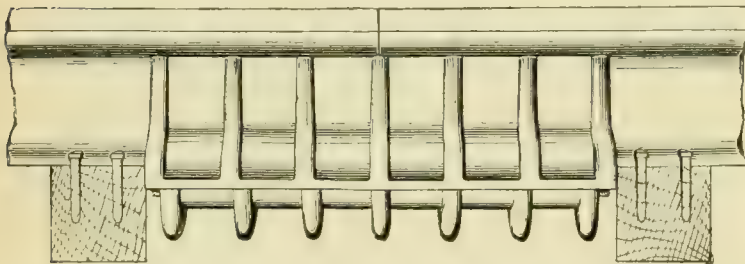
almost impossible to temper such long springs evenly. To obviate this the R. D. Nuttall Company now makes two 9-inch springs in place of the 18-inch spring formerly used. The Nuttall Company is adding new machinery to its already extensive works, increasing their capacity 50 per cent. The output of trolleys alone is at present over 500 a month, to say nothing of the many other street railway supplies turned out.

THE WHEELER RAIL JOINT.

Much attention is being given to continuous tracks, and there are several devices on the market, which are giving satisfaction where they are in use. In the device shown in this connection no bolts are required, as the joint is tightly wedged. In order to tighten or loosen it, a blow with the sledge is all that is necessary. It does not require much labor to place it in position, and the manufacturer says that when there it stays, saving the expense of tearing up pavement to tighten nuts. The joint also has an extra large bearing surface on the rail which gives greater support than many joints. In order to prevent one rail end from dropping lower than the

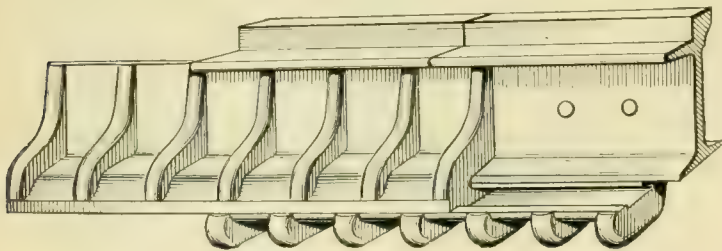


CROSS-SECTION.



ONE SIDE HALF REMOVED.

other, the joint has a ledge, which extends its entire length, and can be used on any kind of rail. The illustrations show the manner of applying the joint. The



IN POSITION.

joint, which is manufactured by the Wheeler Rail Joint Company, New York, has been adopted in New York, Boston, Hartford, Terre Haute, Ind., Columbus, O., Chicago, Buffalo, Staten Island, Port Huron, Mich., and other cities.

Bishop Keene, of the Catholic University, Washington, has addressed a letter to the District Commissioners, begging them to allow the trolley system of the Eckington & Soldiers' Home road to remain undisturbed.

PEAR-SHAPED TROLLEY WIRE IN CHICAGO

The first street railway to use the pear-shaped trolley wire first employed this spring on the Nantasket beach branch of the New York, New Haven & Hartford railroad will be the Clark street line of the Chicago City Railway, now being built from Twenty-second street to the postoffice, in the heart of the business district of Chicago. The wire is made by John A. Roebling's Sons Company, and a section is shown in the accompanying outline. It has a cross sectional area of 330,000 circular mils and weighs about one pound to the foot. There is a strong probability that it will find an extensive use in the near future, and several other roads are contemplating its adoption. It has two decided advantages over the common No. 6 wire. In the first place it offers a perfectly smooth surface at the hangers, and in the second place its conductivity is over three times that of a Number 6 trolley wire, and consequently not as many feeders are needed. The latter advantage was the one which resulted in its choice for the Clark street line. The traffic on the line will be very heavy and the feeders must be run underground. Consequently it was desirable to get as great a conductivity in the trolley wire as possible, so that the underground feeder conduit would not have to be extended far down town. By using this wire the conduit is only brought to Harrison street, half a mile from the probable final northern terminus of the line at the city hall and about one-third of a mile from the present terminus at Adams street. A conduit using tile ducts is to be employed. The line is two miles long, and a large number of the electric cars of the company will find a down town terminus over it. It has been supplied with the Falk Manufacturing Company's cast-welded rail joint. Center pole construction will be used, On account of the weight of the wire, G. W. Knox, the electrician, has designed specially large hangers—about one-third larger than the ordinary. These are being made by A. & J. M. Anderson. The clips for holding the wire are also of Mr. Knox's special design and are about one foot long.



IN AGRICULTURAL BOSTON.

The Boston street car conductors rarely add the word "street" in calling the thoroughfares. The other day as a car passed Water street the conductor shouted "Water" and a gentleman from the rural districts, who sat midway of the car, glanced anxiously toward the rear. It was a hot day, and possibly he thought the conductor was suffering from thirst or on the point of sunstroke. The car rolled along to the next street, and the conductor shouted "Milk." The rural gentlemen hastily opened his valise and fished out a bottle of milk. Waving it triumphantly in the air, he shouted: "Here ye are, mister."

Charles Jenkinson has been appointed superintendent of the Mobile, Ala., Street Railway Company.



K. & I. BRIDGE COMPANY'S LINES—STEAM AND ELECTRIC TRAFFIC COMBINED.

KENTUCKY AND INDIANA BRIDGE TRAFFIC.

Last month we gave an account of the interurban business of the Kentucky & Indiana Bridge Company between Louisville, Kentucky and New Albany, Indiana. The electric trains are run in the intervals between the freight and through passenger trains. We show herewith some views along the line, which arrived too late for our July issue. The bridge and approaches are single track and the balance of the interurban route is double track. The total length is 4.11 miles. An average of 270 trains a day are run, of which 141 are electric. The electric interurban trains connect with the New Albany Railway, controlled by the same company. George MacLeod is superintendent.

QUARTER CENTENNIAL CELEBRATION.

The twenty-fifth annual celebration of the founding of the American Electrical Works, of Providence, R. I., was fitly observed by an elaborate clam dinner, which was the seventh annual. A large attendance of electrical and newspaper men was present, and as on former occasions the event was a great success.

LIBERAL POLICY PAYS.

Many of the Council Bluffs people are up in arms against the motor company which operates across the big bridge connecting that city with Omaha. It seems the motor company refuses to run its cars around the loop, to the great inconvenience of passengers for the upper part of town. According to reports many have refused to patronize the cars between their homes and business, and are walking. Others ride down and take transfers to Omaha, which they do not use but hand to the first waiting passenger they meet at the transfer point who wants to cross the river, thus keeping the company out of the five cent fare it would otherwise have earned. One man has thus given away three checks a day for two weeks, and decreased the roads earnings \$1.80 in that time. While a manager cannot concede all requests made by an indiscriminating public, it always pays to be as fair and liberal as circumstances will possibly permit. Of two grocers you will trade with the one which gives good measure, in preference to the one who takes one raisin out of the scales to make them balance.

The Auburn City Railway Company, Auburn, N. Y., has made extensive improvements at Lakeside Park.



TRAILER



ON THE BRIDGE—WAGON ROAD EACH SIDE



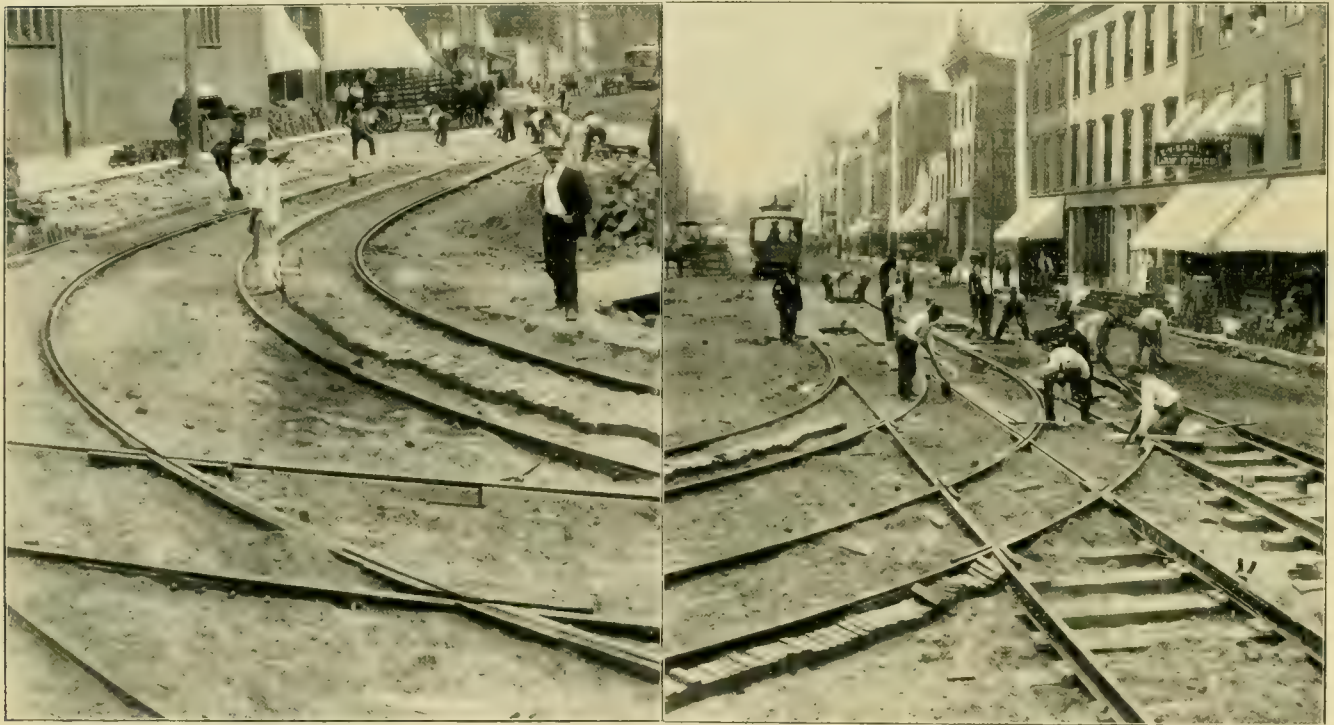
INTERIOR ELECTRIC CAR

TRACK CONSTRUCTION AT FT. WAYNE.

Eight years ago the city of Ft. Wayne, Ind., laid some brick pavement which is, apparently, as good to-day as it was when it was laid down. Consequently the citizens will have no other kind of pavement in the streets. The illustrations show some of the track construction of the Ft. Wayne Electric Railway Company. White oak cross ties are used upon which small blocks of inch oak strips are placed. Resting upon the strips are 60-pound Shanghai T rails, made by the Illinois Steel Company, Chicago. Between the flange and the head of the rail is placed an inch oak strip. Two layers of brick are laid lengthways from the rail out, and the ties are ballasted. The center of the track and the spaces between tracks

were lodged there; and finally baby carriages, and then the nuisance became so great that most roads issued an order and the rear dash was once more liberated.

The summer cyclists are just now greatly exercised over the refusal of the companies to consider a bicycle as a part of the "hand baggage" which passengers are allowed "to carry in their hands or on the lap." The cyclists retaliate by offering to pay a ten cent fare for the offending wheel. They do not, however, seem to realize that a wheel hung on a dash will in five minutes scratch off as much paint from a car as can be repaired in a day, so say nothing of the loss incurred in the use of the car while in the shop. The great objection is, however, in the danger of fouling the brake handle. Ninety-nine wheels might be carried without the occasion once aris-



TRACK CONSTRUCTION—FT. WAYNE.

are filled in with cobble stone, gravel, and old paving blocks, which makes a good pavement and, at the same time, uses up the old material. All the special work was made by the Paige Iron Works, Chicago.

BICYCLES ON CARS.

When the bicycle fever was in its earlier symptoms it was no infrequent sight to see a weary rider getting back home on a car with his wheel hung over the rear dash, suspended from the brake handle. Sometimes the wheel had met with an accident, and but for the car would have had to be pushed home, or carted in an express wagon.

While this arrangement was unquestionably a good one for the cyclist it was not so for the company. Encouraged by the possibilities of the rear dash, it was but a short time when clothes baskets and other impediments

were lodged there; and finally baby carriages, and then the nuisance became so great that most roads issued an order and the rear dash was once more liberated. The summer cyclists are just now greatly exercised over the refusal of the companies to consider a bicycle as a part of the "hand baggage" which passengers are allowed "to carry in their hands or on the lap." The cyclists retaliate by offering to pay a ten cent fare for the offending wheel. They do not, however, seem to realize that a wheel hung on a dash will in five minutes scratch off as much paint from a car as can be repaired in a day, so say nothing of the loss incurred in the use of the car while in the shop. The great objection is, however, in the danger of fouling the brake handle. Ninety-nine wheels might be carried without the occasion once aris-

ing to use the rear brake handle, and the hundredth time there might be an emergency when any hindrance or failure to instantly use the rear brake handle would cause a serious accident in which passengers would be killed or injured. And then what a howl these same papers, which are now berating the companies, would set up; and how they would fill the scareheads with adjectives of the grasping corporations which for a paltry extra dime put people's lives in jeopardy! In our judgment a passenger street car is no place for a bicycle. If one breaks down and the rider cannot remove it, he will never have far to go to some place where it can be left in safety. Managers know best what is safe and desirable in order to secure the greatest convenience and safety to the majority, and they know that festooning their cars with baby-cabs, lawn mowers and crippled bicycles is not included in the list.

At Salt Lake, in response to a petition from the cyclists, the Rapid Transit Company has consented to carry disabled wheels on open cars and issues the following bulletin:

"Conductors will receive and carry the disabled wheel of a gentleman or the wheel of any lady caught in distress, provided the wheel is accompanied by the owner, who agrees to hold the same in an upright position as near the first inside space of the car as practicable for passengers to secure a seat.

"Each wheel and passenger together to be charged as five passengers and to be rung up in each division."

INTERURBANS IN VERMONT.

Commenting on the recent article in these columns on the interurban roads in the United States, the Burlington, Vt., Free Press says:

"The construction of electric railroads in Vermont has made marked progress during the past two years, but our record is insignificant as compared with that of some other states, both as regards roads constructed and new lines projected.

"Vermont makes a favorable comparison with other New England States in the matter of new electric road projects; for we have a number in process of incubation in addition to those completed this year, or in process of construction.

"In previous years the great majority of electric railways were built through the streets of cities, but a striking feature of present electric road construction is that in a majority of cases the lines are intended to connect cities and towns.

"All of the electric roads constructed thus far in Vermont run from one town to another as well as through the streets of the principal towns on the lines, and it is safe to say that as the advantages of the system become better known and electrical appliances more economical, the use of electric railways to connect neighboring towns and cities will be extended to a marked degree."

NEW TYPE BOOSTER.

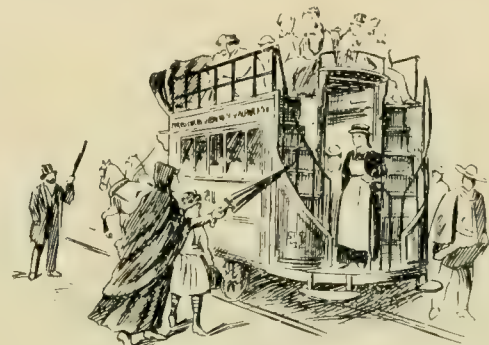
The trolley labored long and patiently to get a start in this city, and while it has succeeded in getting its poles in on some 100 miles or more of streets, it has not been urged to locate in the heart of the business district. One of the lines however, succeeded after many promises of good behavior, in crossing the river and working its way two blocks into the enemy's territory.

The other day an opportunity was offered of winning a large wreath of laurels. A teamster with a pair of worn out horses tried to climb the steep ascent of the approach to the Clark street bridge. His load was five tons of coal, and when half way up the outfit stalled. The horses pulled and fell, the driver gave vent to chromatic language, the teams behind instantly formed a blockade extending across Water street with the inevitable chaos there. Two policemen and several hundred

spectators volunteered advice and gave shipping directions while matters grew worse. Presently the trolley car loomed up, the other vehicles managed to crawl off the track; the horses were headed for the bridge, and the way that big load of coal climbed the hill was a caution. The team managed to escape being run over, but it kept them busy getting out of the way. Then the people smiled and remarked one to another, "I always said there was nothing like the trolley."

STREET CARS AT VALPARAISO, CHILI.

In Good Roads Frank W. King writes of some of the peculiar street railway practice of Valparaiso. It is a city of 150,000 population. Only a small part of the city is on the flat. The rest is mountainous. The people patronize the street cars liberally and Valparaiso Suburban Railway stock is daily quoted at from 25 to 30 per cent premium. The cars are similar to European



STREET CAR IN VALPARAISO.

double deckers except that the driver is perched up on an omnibus seat with a hood or buggy top to keep off sun and rain. Of course they run only one way and require loops or turntables. The conductors are girls following the Spanish custom. Inside the car 5 cents and on top 2½ cents is charged. Very aristocratic Chilians ride in the first class inside and to draw this class of traffic the inside appointments are made very fine. The conductors earn \$30 per month and are furnished a blue serge over-dress, a straw hat and a white apron for uniform. At Valparaiso the driver has a whistle for warning pedestrians. In other South American cities the horn is the customary musical instrument for this purpose. According to Mr. King only one rail is grooved, the other being flat.

Steam and electricity are at war between Elizabeth and Newark, N. J. The Consolidated Traction Company carries passengers from any point in one city to any point in the other, and return, for 20 cents. The lowest fare over the Jersey Central is 25 cents, with the disadvantage that, in most cases, the passenger must pay another fare on a trolley car to reach his destination. In consequence the steam road traffic has dwindled to almost nothing and a wholesale reduction of fares is contemplated.

THE AQUA AERIAL TROLLEY.

As a pleasure resort feature for such roads as have lakes or rivers, or deep gorges, the device operated by W. F. Brothers, at Coney Island and illustrated in the *Scientific American*, will be of interest.

A $1\frac{1}{3}$ -inch cable, 825 feet long, is stretched high in air, from the landing out over the water, to a pair of lofty shears. On the cable runs a 2-wheeled frame, carrying the motorman, trolley pole and 10-horse motor, which alone weighs 1,200 pounds. The car-boat is suspended by wire ropes, which wind upon a drum, friction-gearred to the motor, enabling the operator to raise or lower the boat at will. The timbers forming the shears are each 104 feet long, anchored at the bottom and inclined outward at an angle of about 45 degrees. From the apex of the shears is suspended a platform, weighted down with 5 tons of sand in sacks, to keep the cable taut. The sand is carried to the platform by the motor car.

The boat is carried at a level high enough to just

advantages over common petroleum, and is obtainable almost anywhere. The reservoir near the engine contains sufficient fuel for a thirty-five mile run, and the supplementary tank, generally stored in the rear of the carriage, contains enough for about 120 miles. The fuel consumed costs little over $\frac{1}{2}$ d per mile. About eight gallons of cooling water is required for keeping the cylinders at the right temperature, and this water has to be supplied every twenty-five to thirty miles.

Two cylinders are used in the engine, which with the driving mechanism are of simple construction, easily understood and handled, and free from danger of explosion.

The special features of the Daimler motor are the quickness with which it can start the carriage, and the fact that it emits neither heat, smoke, soot, nor smell. It is also easily accessible from all sides, and is fitted either in front or in the rear of the carriage. The power is transmitted to the axle by cog-wheels and chains. The steering is effected by a lever easily worked by the left hand, and causing no fatigue even on a long run. The right hand and feet work certain levers for putting the



escape touching the tops of the breakers. At the outer end, a stop is made for a few minutes to give passengers a view of the sea and distant shore. The illustrations show a boat load starting out from the trolley house, arrival at the shears and the unloading on the beach.

An improvement would be, the enlargement of the platform and its use as a half-way house. With comfortable seats and a wide awning to intercept the hot rays of the sun, the platform should be a delightful, cool, and breezy spot.

Electric street railways could improve on the Coney Island aerial trolley, which has its own little power plant, by taking the current from the street railway circuit, and making the installation still more inexpensive.

COST OF HORSELESS CARRIAGES.

An English manufacturer of horseless carriages gives a description of one of his devices which took part in the recent road race. The motive power is the Daimler motor which is really a gas engine of the four cycle type running at 600 revolutions per minute. It makes its own gas from rectified petroleum or petrol or benzoline, of a specific gravity of 0.680 to 0.705, which has many

engine in and out of gear, varying the speeds, as well as putting on the brakes whenever necessary.

The average rate of traveling is about eight to ten miles an hour, but it may be increased to fifteen or even twenty miles. The highest speed is generally employed on the more level ground, and the lowest speed (owing to the greater power required) is used in mounting hills or going over bad roads. The Daimler carriage can easily take a gradient of 1 in 10 even on a long hill; and the uphill speed varies from three to seven miles.

As each of the two front wheels has its own pivot, it is easy to move backwards or forwards, and can be brought to a standstill in a few feet. Vehicle complete costs from \$900 to \$1,200 according to amount of power and finish of woodwork and upholstery.

THATCHER COMPRESSED AIR CAR.

Reports of the experimental operation of the Thatcher compressed air car, the first trial of which was somewhat disappointing, indicate much improvement. The promoters claim the pressure used will run the car 26 miles an hour. The storage has an initial pressure of 2,000 pounds. The test is being made at Albany, N. Y.

DEY-GRISWOLD HYDRAULIC GEAR.

Much thought has been expended in attempting to devise some form of gearing of electric railway motors that will enable the motor to run continuously and prevent the great waste of energy which now takes place in starting a car. The actual horse-power expended in starting a car is not large. While the horizontal effort

is so much to the cost, weight and complication of the machinery on a car that it has never found favor.

Harry E. Dey, of the Dey-Griswold Company, has attacked the problem with a hydraulic gear. The motor is put in the center of the truck and drives a set of pumps filled with oil which is piped to fluid motors on each axle, and so drives the car. The motion of the car is therefore dependent on the motion of the pumps and it

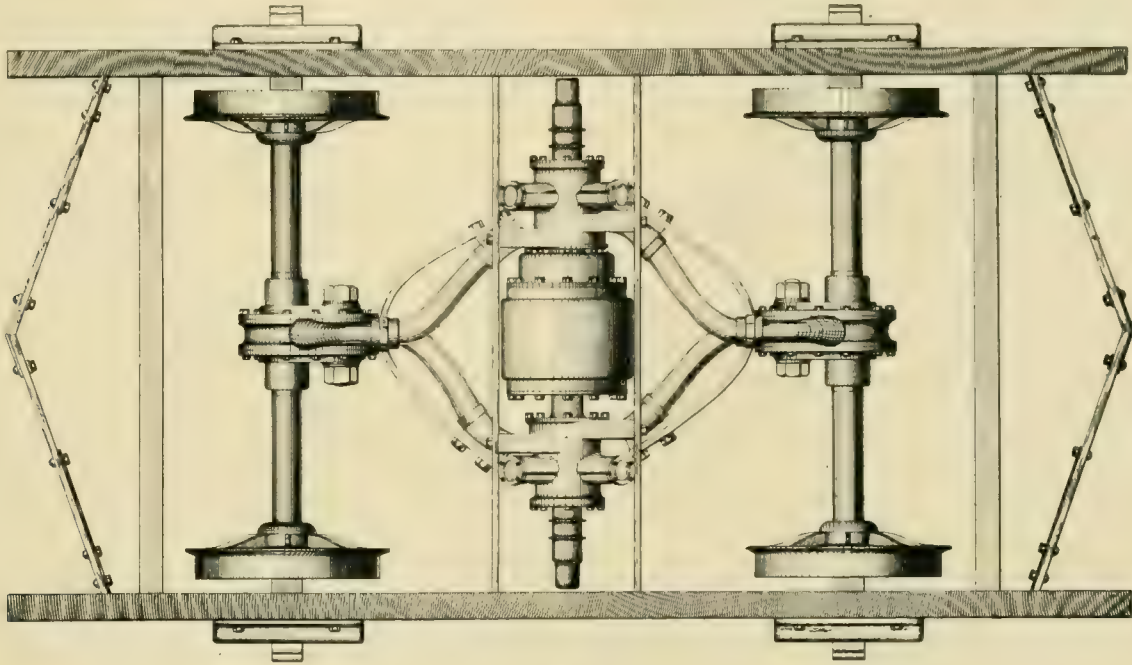


FIG. 1.

is great the speed is low and as horse-power is speed multiplied by horizontal effort the horse-power is low. The object then has been to devise a gear which will allow the motor to run at full speed and make use of all its available horse-power in the process of starting. The useful horse-power exerted by an electric motor in starting a car is only a small fraction of the energy that is

is manifest that when the pumps are operated with a very short stroke (although at constant speed) an immense effort can be exerted at a slow car speed as in starting, while for higher speed and less horizontal effort the stroke of the pumps can be increased. The most essential element of the whole arrangement is therefore the variable-throw crank which connects motors to pumps.

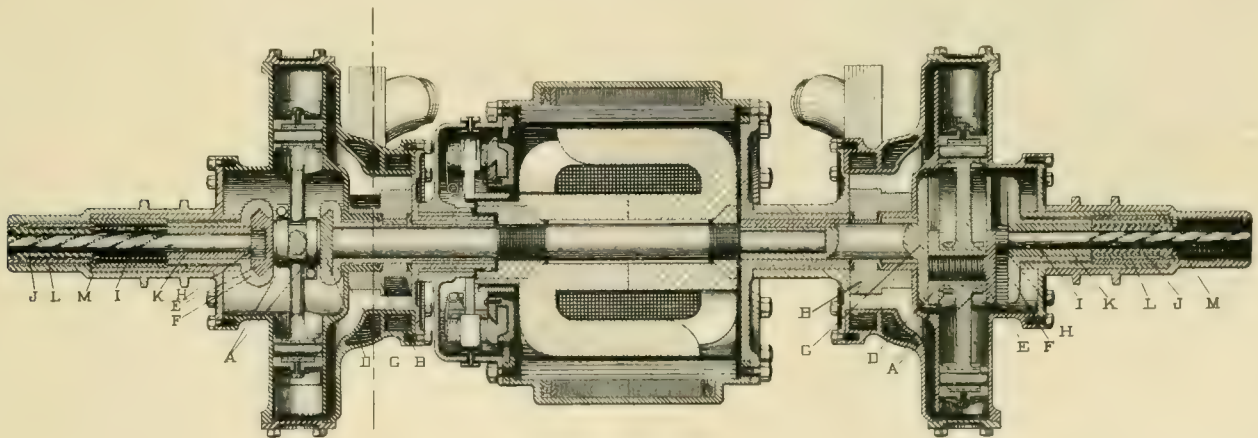


FIG. 4.

consumed by it in so starting. The balance is wasted in heating motors and resistance. Various forms of gearing have been proposed to overcome this. The electrical method devised by H. Ward Leonard several years ago accomplished the end but the apparatus necessary added

These pump cranks are on the motor axle and can be given any stroke from zero to 3 inches.

A general plan of the motor and hydraulic gear is shown in Figure 1. Figure 2 is a section through the pumps, and Figure 3 a section through the fluid motor

on the car axle. Figure 4 is a section through the motor and pumps and is the most interesting part of the apparatus. It will be seen that it is somewhat complicated. Both motor and armature revolve. The armature is connected to one pump and the fields to the other. This

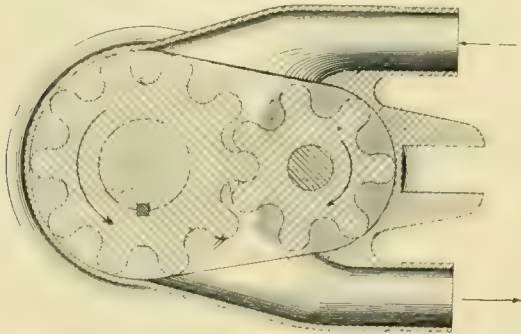


FIG. 3.

gives a high inductor velocity to the armature with one half the pump speed otherwise required. The fields are internal and the brushes bear on the end of the commutator to avoid the action of centrifugal force. The length of the stroke of the crank is regulated by the motorman as follows: The crank DE slides in the dovetailed pieces FG which are fixed on the revolving axle. The crank

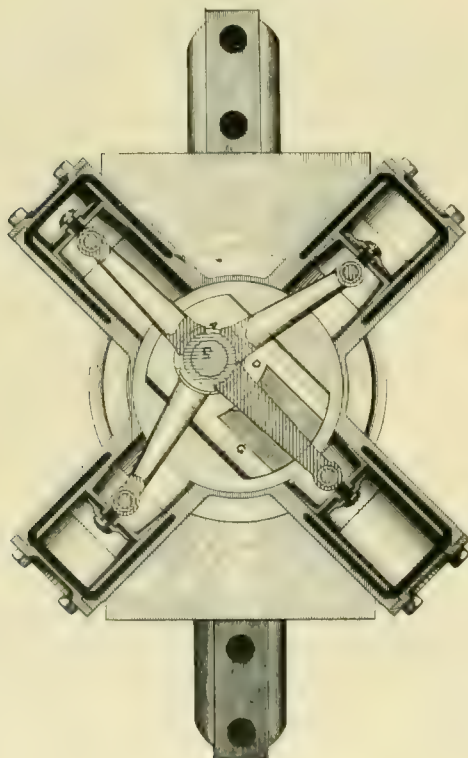


FIG. 2.

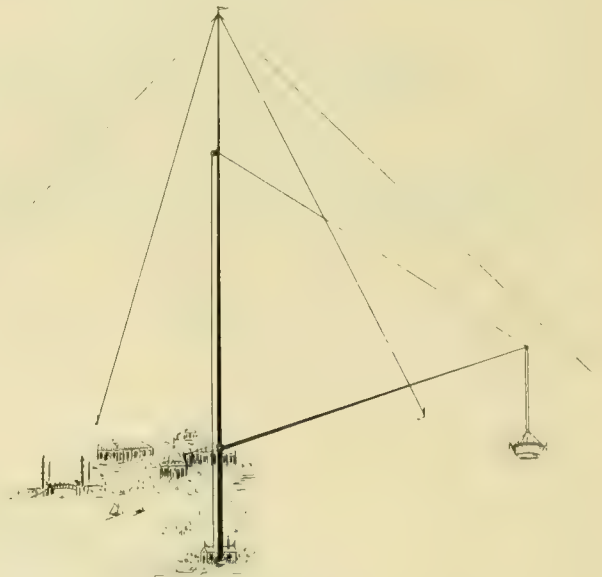
has a rack meshing in the pinion H. This pinion is keyed to the shaft I which has four high pitch threads cut on it. The nut J threads on these and also slides in a groove in K, which is an extension of the main shaft with which all of these parts revolve. A normally stationary nut L threaded on the outside has the nut J freely revolving inside of it and kept in position by the collar

shown. Working over the thread of the nut L is the sprocket nut N worked by a chain from the front platform.

The motor is shunt wound running at practically constant speed. When the car is to be stopped the reverse process takes place from that when the car is started. The stroke of the pumps is shortened by the motorman and the fluid motors on the axles drive the pumps and increase the speed of the motor. As it is shunt wound it gives back energy to the line and acts as an electric brake. This not only is useful in making stops but returns energy to the line when going down hill. The motor need not be as large as the usual series motor because it never has to do more work than required when the car is at full speed. The controller and rheostats are done away with. The Dey-Griswold Company of which the inventor is president has recently been incorporated to do a general electrical manufacturing business.

SUGGESTION FOR SIGHT-SEEING.

Some inventor thought to out-do the Eiffel Tower and the Ferris Wheel by a contrivance something like the illustration, to be erected at the Atlanta Exposition. It consists of a crane with a mast 500 feet high. At the

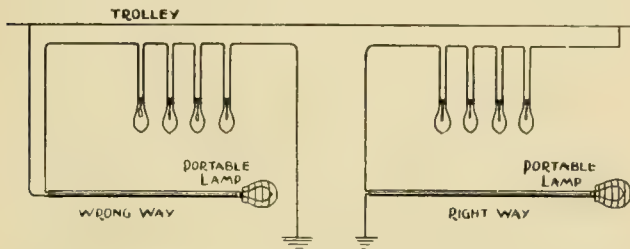


end of the arm was to be suspended a basket, which would hold a party of 25 people. The basket was to be let down on the ground, so that the sight-seers could enter it. When all was ready, the machinery would be started, and the basket raised and the arm revolved so that the passengers could get a birdseye view of the exposition grounds.

A. L. Stone, secretary of the Oakland, San Leandro & Haywards Electric Railway Company, has been working on a plan for an athletic field on the line of his road to cost \$25,000. If he succeeds, at least two tournaments will be held each year in which the clubs of San Francisco and the neighboring cities will join.

PORTABLE BARN LIGHTS.

An unfortunate accident at Davenport, Iowa, calls attention to the advisability of certain precautions in regard to portable incandescent lights used in the pits and around car barns. In the accident referred to, a man was killed by a shock received from a portable lamp he was using under the car. That he must have had heart disease or some weakness that made him an easy victim is very likely, but that is not what we started to discuss. The portable lamp he was using, was the first one from the trolley wire in the series of five, and hence it was possible to receive the full trolley voltage. If portable lamps are made the last in the series, or next to the ground, it is manifest that the greatest voltage from



CONNECTION OF PORTABLE BARN LAMPS.

which a man can get a shock is 100 volts. If the portable lamp is the second from the ground, the greatest voltage is 200 volts, and so on up through the series until 500 volts is reached. Now it would seem to be nothing more than a reasonable precaution to use as portable lamps, only those two nearest the ground in the series. To have the first lamp in the series, which has a pressure of 500 volts from the ground, throwing around on the ground and in the dirt and moisture, is to invite short circuits and shocks. The rules of the underwriters require the wires leading to all portable pit lamps to be covered with rubber hose. How many car barns regard this rule? Probably only those that have been visited by the insurance inspector. Portable lamps are not in favorable circumstances for good insulation at best, and it is folly to increase the danger by putting them in the wrong place in a circuit.

GRANTING FRANCHISES IN CALIFORNIA.

In Oakland, Cal., Judge Ellsworth has decided that franchises in that county granted during the past two years on a percentage of the earnings basis, are illegal. Only the highest cash-in-hand bid can be considered. This decision gives E. P. Vandercook his franchise from Fruitvale to Livermore. Vandercook bid \$25 cash for the franchise, and agreed to furnish lights along the route and supply power to the county infirmary. He also agreed to give the county one-fourth of 1 per cent of the gross receipts of the road after it had been in operation five years. A. D. Thompson put in a bid for the franchise, and offered to pay to the county 2 per cent of the gross receipts of the road after it had been in operation five years. The supervisors did not think this bid was high enough, so Thomson increased it and agreed to give

the county everything offered by Vandercook, besides 2 per cent of the gross receipts of the road after it had been in operation five years. The supervisors thought Vandercook's bid was the best, so they awarded him the franchise and Thomson went to law.

The judge decided :

First—That under the law only a cash bid could be received for a franchise.

Second—That the discretion as to which was the highest bid was with the supervisors.

The decision of the court was a surprise to a number of railroad men who are interested in the granting of franchises. It has been the custom in Alameda county to grant franchises when a certain percentage of the gross receipts of a road were offered. Judge Ellsworth now decides that this plan of granting franchises was illegal. However, the law under which the decision is given has only been in effect two years. There are a few franchises outstanding that come under Judge Ellsworth's decision.

Attorney McKee, who argued the case before Judge Ellsworth for the plaintiff, in speaking about the decision, said : "The decision of the court in this case is of interest to every person seeking railroad franchises in this state. The point decided by the judge that a cash bid must be presented is a new one. Then again, the court holds that the board of supervisors have the discretion to decide which is the highest bid. This is a point that is of much interest. The theory of the law is that there shall be bidding for franchises, so that no favoritism can be shown, and no crooked work done by supervisors. Under the decision just rendered, the whole thing is thrown back into the hands of the supervisors. They can grant a franchise to whoever they please, using their discretion in the matter. If the case should go to the Supreme Court, and the decision should be sustained denying our mandamus plea, I think that it would affect a large number of franchises granted in this state. The custom has been to offer percentages and not cash for franchises."

Under the ruling of the court, Thomson's prayer is denied and Vandercook gets the franchise.

A BASE LIBEL.

"Mister," said the man with the suspicious side glance, "can you tell me where the nearest trolley railroad is?"

"Certainly," was the reply.

"For a dollar and a half I ought to be able to ride about three dozen times, oughtn't I?"

"Yes."

"Well, I guess that'll do. Something is bound to happen within that space of time."

"What do you mean?"

"You look like a kind-hearted man, and I'll take you into my confidence. All I've got is an accident insurance policy and this dollar and a half. My one chance is to cash that policy, and as there hasn't been a smash up of any kind for several days, I feel purty sure that I'm due to draw a dividend."

STREET RAILWAY LAW.

EDITED BY FRANK HUMBOLDT CLARK, ATTORNEY AT LAW, CHICAGO.

Conflict of Telephone and Electric Street Railway Plants.

The unnecessary conflict of poles and wires of a trolley railway company with those of a prior existing telephone plant to the damage of the latter, makes the railway company liable for the cost of necessary changes made by the telephone company; but the latter cannot recover for loss by induction where a provision of the statute prohibits its obstructing the ordinary use of the street.

The destruction of the use of a telephone plant, caused by conduction resulting from the operation of a single trolley street car line which charged the earth for half a mile on each side with powerful currents of electricity, makes the street railway company liable for the cost of return wires for the telephone line as a substitute for the ground circuit.

The court said in part:

It is in vain to say that induction is not an obstruction if defendant shall be held for the unavoidable damage caused by it. It is true, induction implies no physical contact of the two plants, but it is a direct and immediate result of plaintiff's use and occupation of the streets. The presence of plaintiff's poles and wires upon the streets causes induction, and their removal would obviate it. The plaintiff cannot recover for the loss sustained from induction. It results from its unlawful obstruction of defendant's use of the streets. The consideration of other questions is irrelevant in this connection.

Is defendant liable for loss sustained by plaintiff from the effects of conduction? The loss by conduction, unlike that caused by induction, does not result from plaintiff's obstruction of defendant's use of the streets for an ordinary purpose. This interference would occur, and cause precisely the same loss to plaintiff, and in precisely the same manner, if plaintiff had no poles or wires upon the streets. Loss by conduction does not result in the slightest degree from the presence of plaintiff's poles and wires upon the streets, and would not be to any extent remedied by their removal. The contact between the two plants, caused by conduction and the consequent injury, does not occur upon or within the streets or through the medium of plaintiff's poles and wires located upon the streets, but upon plaintiff's private property, and that of its subscribers, lying outside of the streets, and within half a mile on either side. The fact of plaintiff's occupation and use of the streets—a controlling factor in determining defendant's liability for loss by induction—is irrelevant in the consideration of the question of defendant's liability for loss by conduction. This question must be determined as if the plaintiff had no poles or wires upon the streets. The proviso in the Statute of 1885, forbidding plaintiff, by its use of the streets, to obstruct their ordinary use, has no application to the question under consideration. That statute limits plaintiff's use of the streets, but it does not abridge its right to private property outside the streets, and wholly detached from their

use. That statute confers upon plaintiff the use of the streets, and limits that use. It does not confer upon plaintiff any rights of private property outside the streets, and does not undertake to abridge any such rights. The proviso pertains wholly and exclusively to the use of the streets. The defendant's claim to the dominant use of the streets, if conceded, has no place in the consideration of this question, involving the rights of the parties outside the streets.

* * * * *

Although the precise question determined in this case has not hitherto been necessarily involved in the decision of any case, it has, nevertheless, been considered by some of the courts, in *Hudson River Teleph. Co. v. Watervliet Turnp. & R. Co.*, 135 N. Y., 393, 17 L. R. A. 674 (decided in 1892), the court of appeals of the state of New York expressed its views as follows: "The defendant insists that it has an equal right with the plaintiff to make use of this property, or law of nature, in the conduct of its business, just as all are entitled to the common use of the air and the light of the heavens, which, in a certain sense, is undoubtedly true. But the defendant does something more. It does not leave the natural forces of matter free to act, unaffected by any interferences on its part. It generates and accumulates electricity in large and turbulent quantities, and then allows it to escape upon the premises occupied by the plaintiff, to its damage. We are not prepared to hold that a person even in the prosecution of a lawful trade or business upon its own land, can gather there by artificial means a natural element like electricity, and discharge it in such volume that, owing to the conductive properties of the earth, it will be conveyed upon the grounds of his neighbor with such force, and to such an extent, as to break up his business, or impair the value of his property, and not be held responsible for the resulting injury. The possibilities of the manifold industrial and commercial uses to which electricity may eventually be adapted, and which are even now foreshadowed by the achievements of science, are so great as to lead us to hesitate before declaring an exemption from liability in such a case. It is difficult to see how responsibility is diminished or avoided, because the actor is aided in the accomplishment of the result by a natural law. It is not the operation of the law to which plaintiff objects, but the projection upon its premises, by unnatural and artificial causes, of an electric current, in such a manner, and with such intensity, as to materially injure its property. It cannot be questioned that one has the right to accumulate water upon his own real property and use it for a motive power; but he cannot discharge it there in such quantities that, by the action of physical forces, it will inundate his neighbor's lands, and destroy his property, and shield himself from liability by the plea that it was not his act but an inexorable law of nature, that

caused the damage. Except where the franchise is to be exercised for the benefit of the public, the corporate character of the aggressor can make no difference. The legislative authority is required to enable it to do business in its corporate form; but such authority carries with it no lawful right to do an act which would be a trespass if done by a private person, conducting a like business. If either collects, for pleasure or profit, the subtle and imperceptible electric fluid, there would seem to be no great hardship in imposing upon it or him the same duty which is exacted of the owner of the accumulated water power,—that of providing artificial conduit for the artificial product, if necessary to prevent injury to others." The opinion of the supreme court of New York was to the same effect. An English judge, in a recent case, has thus stated his views: "But, after reflecting much on the merits of the case, on the argument addressed to me, and on the peculiarity of an electric current as distinguished from every other power, I fail to see any reason why the principle should not be applied to it. I cannot see my way to hold that a man who has created, or, if that be inaccurate, called into special existence, an electric current for his own purposes, and who discharges it into the earth, beyond his control, is not as responsible for damages which that current does to his neighbor, as he would have been if instead he had discharged a stream of water. The electric current may be more erratic than water, and it may be more difficult to calculate or to control its direction or force; but, when once it is established that the particular current is the creation of, or owes its special existence to, the defendant, and is discharged by him, I hold that if it find its way into his neighbor's land, and then damages the neighbor, the latter has a cause of action." (National Teleph. Co. v. Baker (1893) 2 Ch. 201.) The same doctrine is maintained by Judge Taft, then judge of the superior court of Cincinnati, and now a justice of the federal circuit court of appeals, in the case of City & Suburban Teleg. Asso. v. Cincinnati Inclined Plane R. Co.

The injury by conduction constitutes such invasion or taking of plaintiff's property as renders defendant liable for the damage done. It is a direct and immediate result of a defendant's injurious act. It imposes a burden upon plaintiff's property that impairs its use and value. The loss is fixed and definite in amount. It can make no difference that no material thing was taken, or that the loss resulted, not from the contact of material things, but through the agency of the subtle and impalpable electric fluid. The important consideration is that a thing of value has been taken from plaintiff for the benefit of defendant as the representative of the public, and for that thing compensation must be made. It is a plain dictate of justice that the public, not the individual citizen, should bear the burdens imposed upon private property for the public benefit.

(Supreme Court of Tennessee, Cumberland Telephone & Telegraph Co. vs. United Electric Railway Co., 27 Lawyers' Reports annotated 236; S. C. 93 Tenn. 492.)

Limiting of Franchise—Extension of Time—Granting Same Street to Two Companies.

A franchise of a street railway under a State statute, subject to the consent of the council of a city to the location, survey, and a construction of the road, cannot be limited by a condition attached to such consent limiting the use of cars and the operation of the railway upon the tracks for which absolute consent is given, to a term of thirty years.

A common council having authority to impose a limitation of thirty years upon its consent to the operation of a street railway may grant an extension of seven years of such franchise.

The grant to an existing street railway company, of the right to build an additional line, does not bring such line within a previous agreement as to its existing line.

Although under the Indiana act of 1891 a city may authorize a street railway company to lay its tracks in the same street on which other tracks are laid, such company cannot run upon such tracks, nor the rails of one be so laid as to prevent or needlessly impede the running of the other's cars.

(Circuit Court of the United States, District of Indiana. Citizens' Street Railway Co. vs. City Railway Co., 64 Federal Reporter 647.)

Two Punches on Transfer Ticket—Liability for Ejecting Passenger.

A street railway company is liable for the ejection of a passenger presenting a transfer ticket punched as of the proper time, although there is an earlier punch-mark upon the ticket, where the later mark is genuine, and the transfer was not given to the passenger until he was leaving the car, although he made a timely request therefor, notwithstanding a rule requiring passengers to examine the transfer and see that it is correct.

(Supreme Court of Pennsylvania. Laird vs. Pittsburgh Traction Co., 166 Pennsylvania State Reports 4.)

A VICIOUS TRANSFER DECISION.

Passenger Cannot be Ejected on Transfer Incorrectly Issued, Says a New York Judge.

An interesting transfer ticket case has been decided in the municipal court at Rochester, N. Y.

The judge holds that the conductor of a car has no right to eject from a car a passenger who presents a transfer that has apparently expired, provided that the passenger alleges that the conductor from whom he received the transfer made a mistake in punching the ticket.

The case in question was that of Victor M. Busley against the Rochester Railway Company. The plaintiff demanded judgment for \$1,000 against the company for ejecting him from a North Clinton street car several weeks ago. The plaintiff presented a transfer ticket in payment of his fare, which was refused by the conductor on the ground that it was a day old. He claimed that it had been given to him within the prescribed period by the conductor of another car. The plaintiff took the

position that when a man receives a transfer he has a right to presume it to be correct and cannot be required to examine it and detect any errors which the conductor may have made.

He was sustained in this view of the matter by Judge Warner, who instructed the jury to find a verdict in favor of the plaintiff, who was awarded \$50 damages.

It is doubtful if the decision could be sustained in the higher courts, for the reason that on this same point the Minnesota courts have ruled that the company has a right to make reasonable rules and restrictions necessary to protect itself from fraud, and that by printing on the ticket a rule that passengers must examine their ticket when accepting it from conductors to see if it is correct.

If the rule laid down in Rochester could be sustained companies would simply be forced to abandon the use of transfer tickets entirely, for any old transfer, regardless of date, hour or line could be offered, and the passenger would simply have to insist that he had just received it, and the conductor would not dare to eject him. And there are hundreds of people who would not hesitate to avail themselves of the opportunity. It does not seem possible that the decision can stand a day on appeal to higher court.

INSURANCE DECISION IN INDIANA.

During the recent session of the Indiana legislature, a bill was passed prohibiting a certain condition in insurance policies. The act provides that insurance companies shall not insert a clause making the insured a co-insurer unless he carries a certain per cent of insurance on the property insured. An exception was made in the case of railroad and marine insurance. Since the act, the question arose as to the position of street railways and Auditor of State Daily has ruled that street railways are exempt from the prohibition. Insurance companies will, therefore, demand the same requirements as formerly.

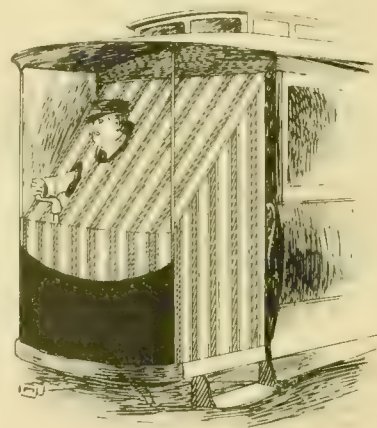
ELECTRIC RAILWAYS IN EUROPE.

A list published in the Deutsche Zeitschrift fur Elektrotechnik shows that there are 91 electric railways built and under construction in Europe. Of these 12 are in England and the balance on the continent. Germany of course heads the list by a very large majority and German electrical companies have built several roads outside their own country. There are five companies making electric railway apparatus in Germany. One of these works under the Thomson-Houston patents. Of the 91 roads in Europe 42 were put in by the two large German companies, Allgemeine Elektricitats Gesellschaft and Siemens & Halske. In France the French Thomson-Houston Company has done the greater part of the work.

The assignee has sold the Street Railway & Electrical News of St. Paul to the Chapin Publishing Company, of that city.

A TENTED VESTIBULE.

Some bright genius whose bump of originality would break a fender, advises protection to motormen by the adoption of a tented vestibule, which can be folded away in pleasant weather and let down when needed. If it was left for the motorman to take it down when "needed" the chances are the tent would forever remain folded. Just think what sport the small boy would derive with a bean-shooter or icy snowball, when the car came gliding along with that head stuck out for a mark, and no chance to dodge. Then the facility with which the brake handle can be worked! We know a scheme worth a dozen tents: It's to sew up the driver's head in a bag and leave him at home all day by the fire.



WARNING TO CYCLISTS.

A considerable portion of the route of the South Chicago City Railway to Manhattan Beach is the one taken by thousands of cyclists. As riding on the sidewalk is prohibited, and the roadway on either side of the car tracks along Seventy-fifth street is none of the best, riders are accustomed to use the space between the tracks. One or two accidents have occurred to careless riders running into the cars, and the narrow escapes have been so numerous, and the company has experienced so much delay in riders holding the track, it has finally solved the problem by ballasting between tracks with slag. This is specially uninviting to cyclists who are further cautioned by frequent signs on the trolley poles:

DO NOT RIDE TOO CLOSE
TO THE CARS.
IT IS DANGEROUS.

LOTTERY TICKETS PROHIBITED.

For many years the conductors and gripmen of the San Francisco cable roads have "played" the lottery and, while in the aggregate their purchases have amounted to thousands of dollars, very few prizes have been won and these quite insignificant in value. To such an extent has the evil grown, Superintendent Vining of the Consolidated has issued a bulletin, warning employes that immediate discharge will follow detection in buying or selling lottery tickets. A similar order has been issued by the other roads.

GREEN HANDS.

A Newspaper Scare Exploded.

The Philadelphia papers, which are to blame for the creation of more idiotic fantasies than those of any other city, have struck a new "lead," and with glaring scare-heads announce a fresh and terrible disease which they term the "green hand."

Now every road at sundry times is sorely afflicted with the mistakes caused by green hands, and the discovery would have required no denial here but for the fact that the item made a vigorous start and is cavorting all around the country where the smaller papers accept it as a genuine article and are misleading a lot of people.

According to the Philadelphia papers, a new and highly dangerous disease has attacked the conductors of open cars in that city, who contract the "green hand" from constantly grasping the brass grab handles when their hands are moist with perspiration. The disease is stated to be a dangerous type of blood poisoning which requires the prompt service of a physician to cure the sores which result, and prevent the "danger of an untimely death." As we had never heard of any serious troubles from this source, we investigated, with results which are far from alarming. Seven of the leading car-builders report they never heard of the disease. Another facetiously remarks: "We have heard of 'green hands' or 'green-horns' serving as conductors, and no doubt there are many cases of this kind in Philadelphia, but we have never heard it suggested before they were caused by the brass handles on the open cars."

Another prominent builder says: "We referred your inquiry to the manufacturers from whom we purchase our brass and bronze trimmings, and we are in receipt of their reply this morning stating that they had never received any complaint of the disease termed 'green hand' said to be caused by the contact of sweaty hands with brass handles."

"These people are doing business in Philadelphia and are supplying all of the roads in that city very largely with bronze work and have never heard of such a complaint. They furthermore say that in all the many years in which they have been engaged in manufacturing brass goods, they have never before heard of such a trouble. Their men are working all the year round in handling brass and they have never experienced such a difficulty. If this danger existed we should think it would be noticed among musicians who handle brass instruments under the most unfavorable conditions. The case that you refer to might be an isolated one and caused probably from some other reasons than those given."

One of the largest brass companies in the country, which supplies a great deal of brass work to car builders writes: "We have never heard of any disease called 'green hands' before. The only effect of sweaty hands upon polished brass or bronze is to tarnish it, and we have no knowledge of any trouble or disease among our workmen that is caused by handling brasswork. If there

was any such trouble we would know it, as our men are handling brass continually with sweaty hands."

"There might be cases of sore hands rubbing on brass work becoming poisoned, and in the case of a motorman who has his hand continually on the brake handle, the pores of the skin in the hollow of his hand might become filled or coated with particles of metal and the acid of perspiration cause a green color on the skin, but even this can be prevented by wearing a glove or having a leather cover on the handle."

Another builder says: "So far as we know the matter you speak of has not been considered of importance. Moisture will effect either brass or bronze metal and some persons are more subject than others to moist hands."

We concede that a man suffering with blood disease which causes sores upon his hands might have trouble of this kind, but such a man is no fit person to conduct a car and handle change, which must reach hundreds of people daily.

Hence, it will be seen there is nothing in the case which renders the use of brass and bronze either undesirable or dangerous.

MAIL CARS SPREADING.

The postoffice department which has so vigorously pushed the urban mail car, is not only gratified at the results to date, but is using every effort to increase their number. Cincinnati is now to be equipped to include all outlying stations. President Kilgour of the Consolidated has promised to assist in every way to further the plan and agrees to furnish service at as low, or lower a rate than any other road in the country. Cars will be built at once and painted white in conformity with the government standard adopted for street mail cars.

It is intended also to shortly introduce the system in Washington, D. C., where there is a fine opportunity to use the cars to advantage.

SHOCKS FROM STATIC CHARGES?

Reports come to us every month of shocks received by conductors, motormen, and others, a part of which are undoubtedly due to leaks in the car circuits. At the same time there are others (that from the reports as they come to us) are not so easily accounted for. The sources of information are not always technically reliable it is true. It has been suggested that sometimes a man may accumulate a static charge (not of Jersey lightning but the orthodox kind) and so get a shock when touching objects of opposite polarity, although it is hard to see how a man moving around in the discharge of his duties as conductor, would do this. We have specially in mind several cases where during rainstorms conductors would get a shock every time they took fare from passengers during several seconds. We would be pleased to give space to the enlightenment of this subject.



Interesting Bits of Information from all Parts of the Country,
Boiled Down for Busy Readers.

Workingmen's tickets at half rates are undergoing a trial on the Muscatine, Ia., Street Railway.

Omnibuses have been pressed into service by the electric railway at Appleton, Wis., while the track is torn up for paving.

Sanford Bennett, receiver of the San Mateo road at San Francisco in his report shows a net surplus of \$18,606 for the year.

The weekly payroll of the General Electric Company, at its Schenectady works is \$45,000 and will shortly be increased to \$55,000.

Alvah E. Green, a conductor of the South Covington & Cincinnati Street Railway has been appointed principal of the central Covington school.

Now that the General Electric has secured the desired land at Schenectady, it is rumored they will move their other shops there and employ 7,000 hands.

The Citizens Street Railway of Detroit and the Metropolitan Railroad of Washington have adopted the plan of stopping for passengers at the near side of crossings, and now the same thing is talked of in Chicago.

An electric track drill has been constructed by the Consolidated Street Railway Company, of Grand Rapids, Mich., copying after the one built by the South Chicago City Railway, and illustrated in the REVIEW for July.

At Norfolk, Va., a motor car and trailer were derailed by a spike placed on the rail by some miscreant. The cars plunged down an embankment and into the stream, causing the death of three passengers and injury of many others.

An employes' reading room has been fitted up by the Hartford, Conn., Street Railway Company. Secretary A. E. Fenner, of the Employes' Mutual Aid Association has charge, and the expenses are borne by the company.

It has been discovered that grasshoppers have eaten up the electric railway connecting Susquehanna and Lanesboro. The surveyors and civil engineers escaped, but lost their documents and instruments.—Great Bend Plaindealer.

When an official party of the City Railway made a pleasure trip in a trolley car they unwittingly started the trolley party fad in Louisville, Ky., and now it is having a tremendous rage in that city even to the amazement of the company.

Passengers on a Seattle cable car were recently reminded of the old days of strap rail on steam roads. One of the slot rails came loose and caught in the grip. The end pierced the floor and coming up alongside the gripman went through the roof. Luckily no one was impaled thereon.

The importance of having feed cables under rivers a good distance below the river bed was emphasized in the neighborhood of New York where a schooner casting anchor to avoid running into a draw caught the submarine cables of an electric road and shut off connection between the power house and a part of the road.

A franchise granted in Little Rock only requires that cars be run after 7 A. M. A local paper sagely remarks that "if no cars were run till that hour it would work a hardship on laboring men along the proposed line, most of whom have to reach their work by 7 o'clock in the morning." Yes, and it might have added would work a good deal bigger hardship on the company.

By their uniform politeness and care of ladies and children the motormen and conductors of the East End line of the Citizens' Railroad, Memphis, Tenn., have won the good will of all patrons. One hot day in August the men were agreeably surprised to find, upon arrival at the terminus, an abundant supply of rich ice cream and delicious cake thoughtfully provided for their delectation by one of the appreciative residents.

Dust is settling on the new machinery in the power house and on the 15 new cars forming the equipment of the Delaware County Passenger Railway Company's new electric road to Castle Rock, a suburb of Philadelphia. Five of the property owners have stubbornly withheld their consent to operation by electricity. In the meantime the company is operating with 10 noisy steam dummies, which, it is to be hoped, will bring the recalcitrants to terms.

The opening of the Gloucester, Essex & Beverly Electric Railway was recently celebrated at Gloucester, Mass. All the prominent city officials of Beverly and Gloucester and the selectmen of Essex, Wenham and Hamilton partook of a sumptuous repast at Surfside and viewed a pageant showing the evolution of vehicles from the time of the Pilgrim Fathers to the present day. Music and fireworks completed the program. An electric car ride is now possible from Cape Ann to Boston.

A mob of Brownsville Jews in Brooklyn came near lynching a motorman who was implicated in a fatal accident on the evening of August 24. The motorman was not to blame for the accident but the mob had been gathered as the result of the arrest of a peddler belonging to its number and when the suggestion of hanging the motorman was made, it found many supporters as the victim of the accident was known to many of the rioters and, as is always the case with mobs, any proposition involving lawlessness received ready support. The police protected the motorman with difficulty.

A YOUNG VETERAN.

The Lone Star State is fast becoming anything but a lonely place, and this result has been accomplished through the efforts of such men as J. W. Greer, general manager of the Yoakum Improvement Company, of Yoakum, Texas. He is an old settler in electric railroading, although still a young man. At the age of thirteen he commenced his railroad career as an apprentice to a carbuilder, and by perseverance and effort successively advanced through the various stages of journeyman, foreman, master mechanic, superintendent and general manager, with the side issues of office man, electrician, and chief of track construction in the meantime. Before accepting his present position Mr. Greer was general manager of the San Antonio lines. His initial electrical experience began with the Van DePoele road in Montgomery, Ala., and the Sprague experiments at Richmond, Va. He also constructed the eighth electric road built; and also the first one in the state of Texas. This was probably the first electric built using T rail, and the first to go in operation where there had previously been no street car line.



J. W. GREER.

NEW YORK ASSOCIATION.

On Tuesday, September 17, the annual meeting of the Street Railway Association of the State of New York will be held at Albany. Special effort is being made to obtain a large representation of supply men and exhibits will be displayed in a suite of rooms in the hotel, which have been engaged for that purpose by the association. On this account it will be possible only to display small supplies. Great interest is manifested in the association, eight roads having become members this year, so that a large attendance is expected, not only of managers and other officers, but of the practical men. An interesting program has been prepared, papers being limited to 15 minutes. G. Tracy Rogers, president of the Binghampton Railroad Company, Binghampton, N. Y., who is president of the association, has charge of details and will be glad to furnish information. The other officers are John H. Moffitt, general manager Syracuse Street Railroad Company, Syracuse, and William W. Cole, general manager West Side Railroad Company, Elmira, vice-presidents; Daniel B. Hasbrouck, vice-president Metropolitan Street Railway Company, New York, John N. Beckley, president Rochester Railway Company, Rochester, Daniel F. Lewis, Brooklyn, executive committee.

THE NEW WOMAN.

He met them at the soda fountain.

"I don't see how you have so much money to spend anyhow," gloomily replied the young man.

"Oh, we have just slipped our car fares again and this is the way we celebrate it," replied his sister.

"Don't you know it isn't right to cheat the car company?" asked the young man, with a judicial air.

"Not right, indeed!" said the girl who had once spent two months at college. "Then why isn't the company made to give us a seat for a fare; tell me that?"

"Um—ah—oh, that is a different matter," weakly replied the young man.

"It is, is it?" retorted his sister. "That's all you know. Oh, it was so funny to-day. We got on a crowded car and kept edging further to the front, so the conductor thought we had paid. The first time he came near us we asked, in injured tones, why he had not given us transfers, and we got them, too."

"But what did you want with transfers?"

"We didn't want them at all ourselves, but when we got off we saw three little ragged boys who looked as if they needed fresh air, so we gave them to them," and the girl in the pink shirt waist looked virtuous.

"But I don't see how you can cheat——"

"It isn't cheating to get ahead of a street car company," replied the girl who had once spent two months in college. "Did I ever tell you how I once passed a dime with a hole in it?" No? Well, I got on a car with that coin, and that only, in my pocket. I was going to a dance that night, and I knew if I walked home I'd be too tired to enjoy it, so I just had to pass it."

"I don't see how you could expect——"

"Don't you? Well, I just smiled up into the conductors face as I gave it to him. He felt that it was a dime, and, with his eyes fixed on mine, gave me a nickel, dropped the dime in his pocket and passed slowly on."

"Ah, oh, wasn't it too funny!" giggled the other girls.

"Why, I know a girl who succeeded in getting two fares at once out of the company," said the girl in the pink shirt waist. "How? Oh, she found she had come off without any money and she didn't want to go back, so she got on with a lot of people, and while the conductor was collecting their fares he had to go out and drive a lot of boys off the rear platform. When he came back she looked grieved and asked: 'Don't I get any change for a dime?' She got it, too!"

"Oh, May, how awfully funny!" cried the girls, while the young man muttered something between his teeth.

"Yes; I told her that I doubted if it was just right, but she said she had been riding on that line every day for two years and they owed her something."

"Pah," said the young man. "Women seem to have no real idea of honor as men have. Now, no man would do such a——"

"Wouldn't he?" asked the girl in the pink shirt waist.

"Well, we'll ask the first man we meet whom we happen to know if he ever slips his fare."

"Yes, and insult——"

"Ah, no; here comes Mr. Gratehed; ask him."

"Here, Gratehed," called the young man. "We are just talking of slipping car fares——"

"You are, eh? Well the best way to do it is——"

Five minutes later the girls led the young man to the drug store and made him treat to soda twice.

FOWLER CAR COMPANY OFFICERS.

The case of the Fowler Car Company, has been called in chancery court, at Newark. Some time ago the property was sold at sheriff's sale under a foreclosure of a mortgage held by H. Heyward Isham. John B. Nealis, of Brooklyn, who held a second mortgage against the property, complained that the price obtained was not high enough.

The order to confirm the sale was opposed on the ground that the property did not bring a reasonable price and that it had not been properly advertised.

The plant consisted of thirty-seven city lots, buildings, machinery, lumber, etc. The real estate and fixed machinery, Mr. Gordon contended, was valued at \$101,000 and brought only \$30,000.

No mention at all had been made of some \$11,000 worth of lumber in the advertisements and consequently mahogany worth \$180 per 1,000 feet, brought only the price of the roughest hemlock boards, one lot of mahogany being sold as cherry, for \$20 per 1,000.

"A closet and contents," he said, "brought \$21, the contents being tools valued at \$357. Another instance of the lack of care exercised." Mr. Gordon said, "was the sale of fifteen tons of coal for \$10." After a lengthy argument the Vice-Chancellor gave Nealis permission to try and sell the property over again provided he could get a higher price.

INDIANA VESTIBULE LAW.

The Indiana vestibule law passed last March applies only to electric motor cars during the months of November, December, January, February and March of each year. It requires a screen constructed of "glass or other materials which shall fully and completely protect the driver, or motorman or gripmen, or other person stationed on such forward end and driving, guiding or directing the motive power by which such cars are propelled, from wind and storm."

The penalty for violation is a fine of from \$25 to \$100 per day per car.

ANNUAL REPORT OF THE TROY CITY RAILWAY.

The fiscal year of the Troy City Railway closed June 30, and the report of Secretary Hagen shows a fair increase. The road has 31 miles of track; 128 motor

and 48 horse cars; 88 horses. Gross earnings, \$454,078; operating expenses (50.55 per cent) \$229,565. Miles run by electrics, 1,798,428; by horse cars, 183,350; passengers carried, 8,652,722. Dividends paid, \$105,000; surplus for year, \$1,892. Road is stocked for \$2,000,000; bonded for \$2,000,000.

ALL THE RAGE.

Milwaukee, Chicago and Brooklyn Come in Line with Trolley Parties.

The fad is spreading. Only a few days ago, Postmaster Hesing, of Chicago, chartered a car and gave a trolley party to invited guests, and now the Calumet Club of Milwaukee has caught the fever. Ten cars coupled in one train were needed to accommodate the 400 guests who participated. A large orchestra filled the first car and discoursed popular airs, as the brightly lighted train glided along pretty avenues. Fireworks had been distributed along the route. The first car was gayly decorated with red, white and blue bunting, and carried 200 incandescent lights of numerous colors. Each car was in charge of some member of the club, although a motorman and conductor attended to the operation of the car. Frequent "tunnels" were encountered along the route, and the director general of the trolley rope realizing the opportunities of his position, made the conventional sleeping car porter sink into insignificance. A return to the club house at 11 o'clock was followed by luncheon and dancing.

IN BROOKLYN.

The Brooklyn Heights road has the honor of the first trolley party in that city, and entertained some notable guests on its trip to Ulmer Park. The start was made from the city hall, and the cars were decorated with banners and colored incandescent lights. Refreshments were served at the park, and the return trip was made at 10:30. The party numbered nearly 400, including many newspaper men and prominent railway and city officials and aldermen. Among the guests were:

President Rossiter and Secretary Williams; Colonel Partridge; President Littell, of the Atlantic Avenue Company, H. H. Vreeland, president of the Metropolitan Traction Company, of New York, ex-Governor Flower, ex-Lieutenant Governor, William F. Sheehan, ex-Register Kenna, S. S. Whitehouse, Postmaster Sullivan, Sheriff Buttling, Police Commissioner Welles, Colonel C. C. Martin, City Treasurer John D. Keiley, Mr. Palmer, the Mayor's secretary, nearly all of the aldermen, Deputy Controller George W. Rowe, Excise Commissioner Forrester, General Christensen, Silas B. Dutcher, Anthony J. Brady, the Albany trolley magnate, were among the excursionists.

Kansas City conductors have been swindled by a man claiming to be a friend of the officials. Having lost his purse he would ask the loan of a half dollar. Several were taken in in that way.

PARIS WANTS NO OVERHEAD TROLLEY.

The chief engineer of the city of Paris, Monsieur St. Marechal, is visiting this country and inspecting the conduit trolley system of Washington. He expressed in decided terms his objections to overhead wires and said under no conditions would they be allowed in Paris on account of destroying the beauty of the streets. As monsieur has just landed on these shores and has not seen much as yet he may be forgiven this offense, and has yet ample time and opportunity to investigate further and repent.

Being questioned as to the success of compressed air on some of the Paris lines he said: "There are three systems operated by compressed air, but they do not work satisfactorily, owing to the large expense incident to their operation, and the difficulty in preventing freezing of the motors in winter."

GAS ENGINES BEAT STORAGE.

The recent road race of horseless vehicles in France is being made the basis of careful comparisons both as to first cost, speed and economy of operation. As an additional evidence of the growing importance of the gas engine the London Electrician states that M. Hospitalier has published an account of the accumulator carriages that took part in the recent race to Bordeaux and back, and the figures show that these carriages have no chance whatever in competition with those driven by gasoline motors.

BROOKLYN HEIGHTS ROAD LOSING MONEY.

The quarterly statement of the Brooklyn Heights road shows a deficit for the three months ending June 30, of \$131,000.

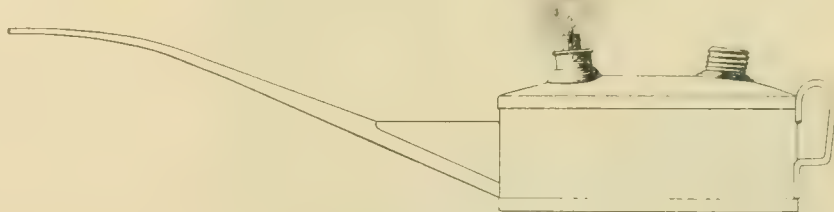
Gross earnings from operation, \$1,086,083.05; operating expenses, exclusive of taxes, \$736,201.81; net earnings from operation, \$349,881.24; income from other sources, \$59,852.76; gross income from all sources, \$409,734; deductions from income as follows: interest, rentals, insurance and taxes, \$540,863.88; and deficit for quarter, \$131,129.88.

SET THE CABLE ON FIRE.

When a cable on the Baltimore City stranded the other day, one of the oilers in looking for the break thrust his lighted torch into the conduit, and left it in there while he went elsewhere. The tar and oil coating on the rope soon ignited and burst into some flame and a good deal of smoke, extending for some distance of track. The oil boxes of the carrying pulleys also joined in the demonstration, until one of the iron manhole covers was red hot. A line of hose was lead from a corner hydrant and the unique conflagration extinguished.

SELF-LIGHTING OIL-CAN.

What seems a very useful addition to a common oil can that has come to us from Germany, is a simple lamp, in which a wick feeds upon the oil in the can. This does not interfere in the least degree with the action of the oil-can, whether the lamp is burning or not, and should



be extremely useful in many a badly lit and awkward corner. The workman being able to see what he is doing will escape many of the serious accidents which now occur and as for the oil used in the lamp the saving of that which is ordinarily spilled and wasted in dark places, will more than feed the small flame of the lamp. The retail price of the oil-can, in Germany, is 35 cents.

ELECTRIC PUMPS ON SPRINKLERS.

A sprinkling car takes an immense amount of water in the course of a day and it is not strange that the charge for water from the city hydrants is a large item. Where there is a large body of water along the route which can be freely drawn from, a good method of avoiding the expense of buying water is to have an electric pump on the sprinkler which can fill the tank wherever water happens to be. This is to be tried by two roads that we have heard of. The New Jersey Electric Railway, of Paterson, has under construction two sprinkling cars with electric pumps for use on long interurban lines where there are many streams and ponds along the route.

The Alameda, Oakland & Piedmont Electric Railway is to try a similar plan, using the ocean as a source of supply.

MUST ASK FOR TRANSFERS.

Street railway passengers who wish transfers must ask for them. This point has been decided by a justice of the peace in San Francisco. Mrs. Mary Keller was on one of the lines of the Market Street Railway, which she was in the habit of patronizing, and was familiar with the rule requiring passengers to ask for a transfer on payment of their fare. She said she asked the conductor for a transfer, but he did not hear her. At the transfer point, she made another demand, but was refused. She had to pay another fare, and sued the company for \$290. The justice decided in favor of the company, and said that had her attorney proved that she had paid the other nickel, he would have given her judgment for five cents.

GRIP FOR THIRD AVENUE, NEW YORK.

The accompanying engraving shows the grip and brake arrangement which has been adopted as standard by the Third Avenue Railroad of New York, of which J. H. Robertson is superintendent. It makes the mechanism of a grip car nearly as condensed as that of an electric car as far as the car platform is concerned. The



NEW GRIP AND BRAKE.

large hand wheel operates the grip. The handle in front of the grip is for the train friction brake. The handle on the left between the wheel and dash, when thrown down breaks the connection between the wheel movement and the grip. The small lever on the right, coming about to the top of the dash, operates the cable throw-out on the grip.

PEOPLE'S PARK AT PHILADELPHIA.

The People's Traction Company, of Philadelphia, will lay out a park at the suburb of Mermaid, the Chestnut Hill project having failed owing to the opposition of residents.

Family parties, picnics and larger gatherings will find ample room to disport themselves on the 21 acres, for which an option has been obtained by W. W. McKee, I. Prowtain and James Moore, Jr. Exclusive of the grounds \$100,000 will be expended on improvements, which will include a hotel of 150 rooms, artificial lake, merry-go-rounds, shooting chutes and the various accessories that go to make up a popular street railway pleasure resort.

PROFIT SHARING AT GLENS FALLS.

Last winter the Glens Falls, Sandy Hill & Ft. Edward Street Railroad began an experiment in profit sharing with its conductors and motormen, a part of which J. A. Powers, general manager, reports is a decided success. Under this plan the conductors receive one per cent of their gross receipts in addition to their regular wages. The results, Mr. Powers says, are fewer complaints from passengers and more careful collection of fares. Another benefit to the company is that the larger wages come dur-

ing the summer months when the receipts are largest. It is during these months that there are the most chances for employment elsewhere and the men would under ordinary circumstances be more likely to leave. Moreover by leaving for a time under the new arrangement they forfeit their percentage for at least a month. The plan of profit sharing with the motormen by giving them a part of the saving in motor repairs was not found feasible.

PACK IS RIGHT.

C. L. Pack, who is the largest individual owner in the Detroit Railway, has returned from Europe, where he closely studied the graduated fare system. He says: "The Glasgow plan of fares would not prove popular in America. In Europe cars make but one-third the stops they do in this country, and that way the rate of fare can vary with the distance. But it would not do to run cars on the same plan in the United States as people want to ride too fast and are always in a hurry. In European countries cars only stop at stated places, and if you are not at the stopping place when the cars come along, no attention will be paid to you by the driver. It would be a difficult feat to get the American people to agree to the change of the rate of fares, as the man that paid the big fare would think he was getting the worst of it, although he was really paying for what he received. I believe the American plan is the better one."

ELECTRIC FREIGHT ROAD AT BOWLING GREEN, KY.

The Park City Railway of Bowling Green, Ky., is another electric road on which the carrying of freight will be a prominent feature. The company owns the only wharf over which freight is shipped to the city and expects to do a heavy freight and coal business between it and the city, a distance of 2½ miles. The equipment at present consists of one freight motor car and four 16-foot passenger cars. There are four miles of track laid with 54-pound rail. Two 115-horse-power Commercial Electric generators furnish the current.

CHICAGO HAS FUNERAL CARS.

The plan so long advocated by the REVIEW of utilizing street cars for funeral purposes has at last become an accomplished fact in this city. A regulation winter car appropriately draped contained the casket, bearers and nearest relatives and other cars followed with friends. The run was made from West Pullman to the gates of Oakwoods cemetery, a distance of 6½ miles, and occupied but a small fraction of the time usually occupied in making the trip with carriages. As the cars were chartered at a price per car no greater than one carriage would have cost, the saving in expense was very great. An effort will be made to run the tracks inside the cemetery gates. The train was run over the lines of the Calumet electric.



Interesting Bits of Information from All Parts of the Country, Boiled Down for Busy Readers.

"It beats the world," said a farmer on his first visit to Topeka, "how them street cars is pushed along with fish poles."

"If the motorman has time to release that thing, he has time to stop his car." This remark of a manager will apply to a great many fenders on the market.

The Walnut Park electric railway has begun operations. It is the shortest line in St. Louis, being only one mile in length, but it opens up a territory north of the cemeteries.

Chief Moore, of the weather bureau, has directed all weather station chiefs to prepare lists of street railway superintendents, and others, to whom warnings of expected occurrence of unusual weather will be sent.

John H. Kirby, receiver for the Houston, Texas, Street Railway Company has appointed W. W. Wilson, general manager; Robert Adair, superintendent; Edward S. Ells, assistant superintendent; Harry C. Chase, cashier and purchasing agent.

The Urbana & Champaign Electric Street Railway Company, Champaign, Ill., has taken hold of the Champaign & Urbana Gas Light & Coke Company, which it will operate in connection with the street railway, electric light plant and West End park.

Baptists cleared \$500 by the sale of street car tickets during their convention in Baltimore last month. A quarter of a million tickets good during the convention were printed to be sold at the rate of 22 for \$1. The companies allowed a commission.

Forty prominent citizens of West Orange, N. J., tore up at midnight, July 15, tracks laid by the Maplewood & South Orange Railway Company, the day before. Hundreds of people, attracted by the noise gathered round and urged the citizens on until 4 o'clock, when the job was finished.

John J. Meade has sued Mayor Schieren, of Brooklyn, for \$100,000. He alleges that on January 23 a volley of bullets was fired into his windows, and that several soldiers broke into his apartments and prodded him with bayonets. He was locked up but was released the next day. The suit is a relic of the Brooklyn strike.

On July 18 the Cohoes City Railway Company, Cohoes, N. Y., formally placed its electric line in operation. It has 4½ miles of track. The officers are Urban Welton, president; J. W. Himes, vice-president; Silas Owen, secretary; Murray Hubbard, treasurer; directors, Hugh Graham, Egbert W. Lansing, Herman Kahn, John Gar-

side, George Simmons; William Finigan, superintendent. It will be extended to Dunsbach's Ferry and Crescent and a freight service inaugurated.

The Middletown Horse Railway Company, Middletown, Conn., has paid a semi-annual dividend of 2 per cent. The local paper says: "For several years as a horse road it did not pay, but since the introduction of the trolley it begins to be profitable. The line is to be extended to Cromwell at once." There is nothing like following up a victory.

Profit sharing was not a success on the Anacostia & Potomac Railway Company. In the June REVIEW was a description of the experimental plan. The men struck July 5 and remained out until July 19, when the difficulty was settled by the company granting the demands of the men for \$1.50 a day for 12 hours work. The men ran a free bus line from Anacostia to Washington, while the cars were tied up.

S. R. Break, before he resigned as superintendent of the Detroit Railway, posted the following: "Notice to Conductors.—There are a large number of fares being missed when large loads are being carried. With heavy business you have the opportunity of showing yourself a good man. The Detroit Railway wants nothing else but good men. I want to see a good improvement in this line, so watch out, you men who only ring up 80 or 90 fares on a fully loaded car and no transfers, and you who are ringing up 120 and over, keep on doing it."

Auburn, N. Y., is having lots of excitement in connection with the street railway. First, the Auburn City Railway Company hired the best band in the city to give concerts at its park. The other band called itself a union band, and gave opposition concerts in town, but the people rode on the cars to hear the good band. Now comes a new company, the Auburn Inter-Urban Railroad Company, which proposes to build lines to Port Byron, Skaneateles and Weedsport. It is charged by the old company that the Business Men's Association has deserted the old company and favors the new one, urging the property owners not to sign the former's petition. The old company says it intends to reach the towns which the other company proposes to reach, and to build another line, but has been prevented by injunctions.

The Philadelphia Traction Company is suing the Electric Traction Company for \$9,500 for a crossing accident. The latter company put in a crossing which it is alleged got in bad shape, and was never kept in safe and proper manner, but was of new and untried pattern, which was unsatisfactory from the beginning. On being notified, the Electric Traction Company sent a gang of men to repair the crossing, who left before the work was completed. A doctor drove over the crossing, was injured and got judgment for \$9,500 against the Philadelphia Traction Company, which it wants the Electric Traction Company to pay.

OUR NEW HOME.

The REVIEW always aims to be alive to every feature of possible interest to the street railway fraternity, which possibly accounts for its having fallen into the habit of moving about once a year. The old saw about failure to pay rent can hardly be urged as an excuse as it has remained with the same landlord all these years, though the changes have carried its offices into four buildings. Each change, however, has been decidedly for the better, and in every instance caused by a necessity for larger quarters to accommodate its steadily increasing force and needs. When a few months ago the REVIEW offices

the view from our windows. As ever, we are always glad to welcome visiting street railway men, for whom ample facilities are provided in the way of desks, writing materials and stenographers. Come and see us.

EXPERIMENTS ON BELGIAN STEAM
ROADS.

Experiments with electric traction are being made on the Belgian State Railways, with the idea of determining the performance of electric motors on light steam trains, at speeds of from 12 to 37 miles an hour. As



OUR NEW HOME.

were burned out it was decided to find quarters which should be ample for some time to come, and within 24 hours after the wreck the entire force were at work in temporary quarters in the Old Colony building, one of the latest, as it is the finest of Chicago's score of sky scrapers. Several weeks were required to make the extensive suite of offices out of the large space secured on the eighth floor, but the arrangements and furnishing of the various rooms was carried out in conformity with the REVIEW plan and desires, and here we are nicely settled, with magnificent views of Lake Michigan with all its shipping on one side and the bustling streets and lofty buildings on the other.

Our illustration shows glimpses of the editorial and business offices and their occupants, while in the center a fairly good idea is given of the Old Colony building and

the experiments were simply to get data on motor performance, no overhead conductors were erected, but the trial car was equipped with storage batteries instead, so that experiments could take place on any portion of the line. The car that has been equipped has three axles with motors on two of them. When loaded with the batteries the car weighs 24 tons, of which nearly 10 tons is due to the battery. At 24 miles an hour the power taken is 49-horse-power. The motors are capable of giving 100-horse-power at higher speeds. The motors are gearless, and the fields are in a circuit independent of the armatures. After the motors have been brought up to speed, with the field fully excited, the speed is further increased by reducing the strength of the field current. Thus when the motors are running 12 miles an hour with full field strength the speed can be

increased to 24 miles an hour by cutting down the field magnetism two-thirds.

The controlling mechanism is very ingenious and it is to be hoped that the experiments may bring forth some new facts of value.

ROAD MOTORS.

The English "Ironmonger" has had a representative investigating the several French manufactures of the new road motors, and from his observations deduces the following :

"The idea of propelling small vehicles by motors seems, as it naturally well might, to have been thought of as early as 1833 when railways were first projected, a steam carriage having been run on roads near London. But for some reason the scheme was dropped again here, doubtless under the soporific influence of absurd legislation, and has slumbered up to the present time. Less hidebound with old notions, the French have been working while we have slumbered, and now they are ahead of us, and likely to continue so, in the manufacture of motor-propelled road carriages. It appears that in France, at present, the gasoline carriage is regarded as the one best adapted for light passenger traffic, but for heavy and powerful traction purposes steam still bears away the palm. But electric and paraffin motors are also used with considerable success, so that it would be unwise at the present stage of progress to give the absolute preeminence to any particular kind. It seems that so far back as 1891 the gasoline road carriage was made and sold, and with the making of the first of these motors is claimed the beginning of the road-motor industry in France. In the manufacture of road phaetons there is a division of labor, the motors being of German manufacture, and the carriages being made and adapted to the latter, and in the particular of the wheels, the bicycle type, with India rubber tires, is employed. The normal performance of a gasoline motor on a good road is from 15 to 18 kilometres an hour; but up hill it is not more than 10. In the recent race to Bordeaux this kind of machine ran 800 kilometres, at an average of 18 kilometres an hour, the pinions making 1,100 revolutions per minute. Its brake power enables it to stop within a yard, and ratchets inside the carriage moderate the rate of speed traveled. The cost is a half penny a kilometre. About 150 of them have already been sold.

"While the foredescribed machines have the motor behind, others have it in front; but water is required to be carried by both to cool the cylinder. In the gasoline carriage the Daimler motor is used, but on the electric carriage a motor made after the Benz system is employed, placed under the back seat, making 300 turns a minute, and in this carriage the vibration is reduced to a minimum, the substitution of straps for chains contributing to lessening the shaking. Another type of electric carriage has the small dynamo and 21 accumulators placed in a box under the seat. The steering handle is in front of

the carriage. Thirty-six kilometres can be done with this without recharging the accumulator.

"In the steam motor class a 20 horse power "tug," as it is called, is considered a very useful vehicle, excellent for uphill work, easily controlled. It weighs 2 tons, can pull 1 1/4 tons at 12 miles an hour up a slope of 8 in 100. There are four sizes made, the largest weighing 4 tons, and pulling 10 tons at about 5 miles an hour. It has a multitubular circulating boiler, the tubes radiating from the centre, and two cylinders. Coke fuel is fed in from the top, and it carries enough to run 60 miles, at a cost of 1 1/2 d. per mile. The axles of the wheel are turned by the machine itself, and the wheels have tires. The chief drawback of the gasoline motor is the liability to spontaneous ignition of its liquid load, and its vibration is considerable. But there is an improved one spoken of, working to 6 horse power (instead of 3), which has neither vibration, chain nor carburators. There is also a petroleum tricycle weighing 80 lbs., running 12 miles an hour, with an aluminum motor.

"The advantages of the three several kinds of machines are thus summed up: Steam carriages for goods and slow passenger traffic—the 'goods train' and possibly the 'local train' of the future in railwayless districts. The gasoline carriage for the tourist or persons who have no fixed itinerary. The electric carriage as the 'cab' of the future. Within the limited radius, but not necessarily so, of a large city, it is believed it will hold its own against all comers."

ELECTRIC RABBIT'S FOOT.

A few days ago a party of railroad and newspaper men visited Niagara Falls as the guests of George H. Daniels, general passenger agent of the New York Central. As a part of the excursion a trip was made over the electric road from Queenstown to Chippewa.

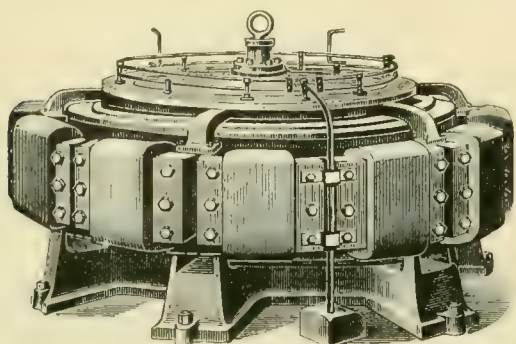
An amusing incident occurred in connection with the trip, which is related as follows by the Electrical Review:

"At one time a crisis presented itself. Ascending the steep grade from the approach to the Devil's Hole the power was not sufficient, and a carload of passengers were filled with trepidation as they viewed the steep incline back of them. The presence of mind of the wise and experienced railroad passenger man asserted itself. Taking from his pocket a rabbit's foot—that had been presented to him by William Leary of the New York Press, under most pleasant auspices—Mr. Daniels waved it aloft three times three, and lo! and behold! the car started and electricity was again triumphant. No one was unkind enough to notice the sand that had quietly been applied to the slippery track."

The Mt. Clemens & Lakeside Traction Company, the consolidation of two companies at Mt. Clemens, Mich., has laid out a park three miles from the city, where there are enough amusements to distract the mind of the worst rheumatic in the world from his twinges of pain.

SALEVE INCLINE RAILWAY DYNAMOS.

One of the interesting features of the Mount Saleve electric incline railway is the form of generator used. It has a vertical axis, being direct coupled to 250 horse-power Jonval turbines 9 feet $10\frac{1}{8}$ inches in diameter. The generators are 12 pole of the Thury type and as they



SALEVE INCLINE RAILWAY DYNAMO.

revolve but 45 revolutions per minute are large in proportion to their output which is 275 amperes at a pressure of 600 volts. The fields are supplied by a separate exciter, the exciter having a turbine of its own. This helps to reduce the difficulty of governing with water power.

 CONFINED IN A WORKHOUSE.

W. Kesley Schoepf has resigned as manager of the Eckington & Soldier's Home Railroad Company, Washington, D. C., and is manager of the Washington & Baltimore Boulevard Electric Railway now under construction. Whether the resignation was caused by a recent occurrence whereby Mr. Schoepf was confined in the workhouse at Washington, has not been made public. Proceedings were begun against the company, because it was alleged that it was occupying public space with private property in maintaining trolley poles on New York avenue. Mr. Schoepf was fined \$25 after the evidence was heard. He didn't exactly feel like paying the money out of his own pocket, and he didn't see how he could pay it out of the company's funds as there was no appropriation for fines. At last he thought of this plan. The attorney was on salary and there was an appropriation for court costs. Why not refuse to pay the fine, get sent to the workhouse, and apply for a writ of habeas corpus? In the meantime the board of directors could appropriate \$25, if the habeas corpus didn't work. The plan was tried, and Mr. Schoepf is constructively a prisoner in the workhouse, wearing a striped suit of clothes and breaking rock, pending a decision of the habeas corpus proceedings, which of course go over the whole controversy. In reality he is as free as any citizen, gets three square meals a day, sleeps in a comfortable bed, wears clothes of the latest fashion, and gets through a large amount of work every day. The petition for habeas corpus was denied when it came up for hearing, and Mr. Schoepf continues to break rock until the appeal is decided.

FEARS AN OCTOPUS.

The San Francisco Chronicle is all doubled up with an attack of electrical jim-jams which comes from studying the table of interurban lines published in the July REVIEW. This table, by the way, has aroused widespread attention from the daily press all over the country, which seems to have had no adequate conception of the present and future magnitude of country lines. With few exceptions the dailies have expressed approval of the progressive work being accomplished and recognize the great value to outlying towns and communities which could not secure steam railroad facilities in the next 20 years or more.

The Chronicle, however, (which from its experience with the Southern Pacific should know better !) discovers that of the 3,457 miles mentioned, 183 miles fall within the borders of California, and already trembles while yet "the young giant of electricity is in its cradle." And a little further on it says :

"If we lay down these projected routes upon the map it is impossible to resist the conviction that the whole country is soon to be covered with a network of electric roads, bringing all parts of the Union into mutual communication. Before we realize it there will be unbroken trolley transportation from the Atlantic to the Pacific. Already the new electric lines incomparably surpass, both in number and length, the beginnings of the steam railroad system. The great trunk lines of railroad, especially in the East, have been formed by the consolidation of swarms of little roads, each originally operated by an independent company and serving a limited district. The same process will be repeated with the trolley."

We had always heard that the one thing California most lacked was additional transportation connections with the East, and if salvation is to come through the medium of the electric roads, why so much the better for electricity, and the state. Therefore there is no occasion for the alarm which follows the above quotation, filling a good part of a column and insisting on all sorts of ridiculous restrictions as to the length of time franchises shall run, and urging the granting of none which do not permit of the towns or counties becoming owners and operators of the properties any day they may take a notion. In other words: if the roads prove successful ; or if run at a loss for years and eventually reach easy street, then the city or county may seize the property which has cost so much money, energy, and risk to create.

There is a magnificent field in California, with its numerous water powers and valleys more largely populated than any in the country, to build interurban lines which shall put the fruit growing districts within hourly reach of the cities and shipping points. What the Chronicle and Californians should do is to encourage in every way possible the construction of new electric lines which have merit and are legitimately promoted. They add to the value of property, increase population and are of direct benefit in many ways.

NOTES FROM CANADA.

Work has commenced on the Belleville, Ont., Electric Railway.

The Montreal Electric Street Railway earned \$100,000 during May.

It is said that the Gananoque electric road to Kingston will be built next year.

An extra mile of street railway track is to be constructed at Peterboro, Ont.

During the month of June the Galt & Preston Electric Railway carried 13,000 passengers.

The work of extending the Mimico Electric Railway to Long Branch, Ont., is now going on.

The Halifax, N. S., Electric Street Railway will cost \$340,000 for building and rolling stock.

An electric railway is proposed from Port Hope to Bewdly on Rice Lake, a distance of 10 miles.

Work on the proposed electric railway will begin this month in Quebec. The city council has approved the plans.

The Montreal Park and Island Railway Company's line up Park avenue through Montreal Annex, was put in operation last month.

The St. John N. B., Street Railway Company has elected J. Ross, of Montreal, president; J. M. Robinson, vice-president and J. Warren, secretary and treasurer.

The electric railway from Buckingham Village, Que., to the station and the boat landing on the Ottawa, which has been talked of recently, will not be built till next year.

A radial electric railway between Sarnia and Florence, to run through Petrolea, Ont., is being discussed, and in a few months will probably be in working order.

The Oshawa Electric Railway was completed and ready for business on June 17, just one month from breaking ground. The line is six and a half miles long.

The Montreal, Park and Island Electric Railway Company has begun the work of construction on the Outremont extension which runs from Cote des Neiges to Westmount.

The Montreal Street Railway Company, at the request of city butchers, will run a night service of refrigerator cars between the cattle markets, the abattoirs and the meat markets.

On July 2, Niagara Falls supplied the first electric power for commercial purposes. The power was sup-

plied to the Pittsburg Reduction Company, and equalled 4,000-horse-power of electricity. It was the first test of the new works of the Cataract Construction Company.

The Galt, Preston and Hespeler Electric Railway has built an extension near Hespeler for the benefit of excursionists. The company will establish a park for picnics and other holiday purposes.

The Ottawa Electric Street Railway Company proposes building a loop line extension to connect with the exhibition grounds. Every effort will be made to have the line completed before the exhibition.

Sherbrooke, Que., capitalists are applying for letters patent, to constitute a company to run electric and horse cars in that city, with power to extend their railway to any place in the district of St. Francis.

The Cornwall Standard says: "The electric railway is again a live issue, and it is expected that the work of construction will be commenced in a few weeks. W. R. Hitchcock, of Cornwall, and D. A. Starr, of Montreal, have already interested several capitalists in the projected road.

The corporation known as the Metropolitan Railway Company, of Toronto, is seeking bonuses from outlying municipalities, such as York, Vaughan and Markham townships, Richmond Hill village, etc., for an electric railway which will make a specialty of freight as well as passenger traffic. The bonuses asked amount to \$60,000.

The charter of the Napierville Junction Railway Company will be amended to permit of the construction of an electric line between St. Remi and Napierville, Que. The directors of the company are: General Riley, Ottawa; J. Fowler, Carleton Place; N. L. C. Peltier, M. P.; L. St. Marie, M. P. P.; E. Lafontaine and T. Henry.

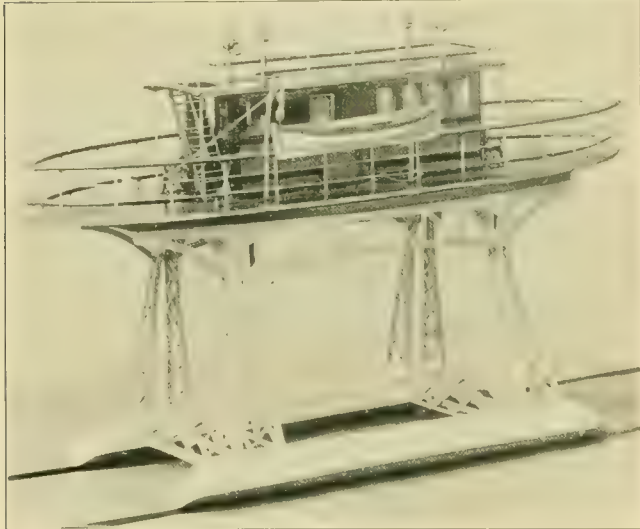
The Hamilton, Grimsby and Beamsville Electric Railway carried 176 tons freight, and transported 19,000 passengers during June. To show how the road has developed since it started last November, it may be mentioned that in the first month it carried 5 tons of freight and 1,080 passengers. It now makes 17 round trips a day. The company is putting on a new freight car 28 feet long, with a double truck.

CHANGED TO ELECTRIC.

Steam dummies no longer run on the Kansas City, Independence & Park Dummy Line. Much to the gratification of the citizens on the line electric traction has been adopted, which shortens the time from Kansas City to Independence to 25 minutes, cars running under 15 minutes headway. The cars have a smoking compartment.

THE BRIGHTON ROTTINGDEAN SEASHORE ROAD.

A very novel electric road is under construction at Brighton, England. One of the accompanying engravings shows the track construction and the other the form



SEASHORE RAILWAY CAR, BRIGHTON, ENG.

of car it is proposed to use. At high tide the right of way is under water so that the car is put up on pillars 25 feet high. The car is to run on all four of the rails, a track supporting each side. The two tracks are 20 feet apart so that the base of the car-supporting structure is nearly equal to its height. The tracks are laid on concrete blocks and the strength of car and tracks is calculated to withstand any wind strain that will ever be put upon it. At one place the tracks are 300 yards from the shore. The capacity of the car is to be 130 passengers. The road is intended as an additional attraction to Brighton as a seaside resort. Although the road is nearly finished as far as track construction and terminals is concerned, we are not informed as to the details of the electrical part of the installation. The charter calls for an electric road. The company recently asked permission to temporarily use steam in order to determine the power necessary to propel a car. This, however, has been refused and the company will have to make an intelligent guess at the power required.

The Norwich Street Railway Company, Norwich, Conn., has a beautiful property in Sachem Park, which is open for the first time. There are many perpetual springs, of sparkling water, precipitous bluffs, rocky caverns and lots of shade.

WANTED A BETTER DIVISION.

Down in Massachusetts, P. F. Sullivan, general manager of the Lowell & Suburban road, is recognized as one of the brightest men in the state association. A good story is told on him which is said to have actually occurred soon after he came to Lowell from Washington:

The good old-system of "knocking down" was in vogue among the conductors, but was quickly put a stop to by the new manager.

But one man, who had a "pull," was incorrigible. He was sharper than a rat-trap and it was hard to catch him. Still the receipts on his cars were always beautifully less than on others. One day he would be put on one route, then on another. His car would be loaded with spotters, but whether he went up Gorham street or Middlesex street, whether the day was warm or cold, the traffic heavy or light, whether the spotters were many or few, he always fooled them and beat the company.

Sullivan called him in the office one night.

"——," he said, "have you brought back that car you ran out to Lakeview to-day?"

"Yes," said the conductor.

"Well, the company and myself are under the deepest obligation to you for always returning the cars you take out. We appreciate the favor you do us by not swiping the cars. But I wish to have you do a little more for us. You own four houses don't you?"

"Yes."

"A couple of trotters?"



TRACK CONSTRUCTION.

"Yes."

"The largest diamond pin and the best watch in Lowell?"

"Yes."

"Well, the company thinks that now you are on your feet you ought to turn us in at least half the receipts. We don't ask the earth; we only want enough to pay the motorman."

With that he bowed the conductor out and that worthy has not since run a car for that road.

THAT MOTOR MAN.

A motor man was Peter Brown,
An honest mason he;
For when two bells were rung on him
He rung "So mote'er be."

Tho' not an active Methodist,
He stood up every hour
To keep the people on the track
Whene'er he had the power.

Although his heart was ever kind
To children poor and rich;
He never thought to spare the rod,
And often used the switch.

He was not called a ladies' man,
And yet 'twas known full well
That when he stopped upon the street
He waited for a bell.

His speech and manners were precise;
He did not blunders make,
Although within the shop they said
He often made a brake.

He did not fear the ills of life
No matter what their grade;
Because to him, reverses were
A portion of his trade.

He ne'er despised the humble poor
Or teased the wrecks of crime;
He would not run on anyone,
Although he run on time.

He died one day, and o'er his head
They wrote this epigram:
"The trolley broke, he breathed his last
Within a current jam."

And now inside the power house
When midnight shadows grow
Is heard these words: 'Pete Brown has gone
Where he will dynamo."

STREET CAR ETIQUETTE.

Will the New Woman Reform?

In the Ladies Home Journal, A. S. Fergus has the following to say as to how a woman should conduct herself in hailing a car:

"There is a law in most communities that requires street cars to stop on the upper side of the crossing in the direction they are going. But no woman is expected to respect this—consequently stand on the wrong corner and signal the car to stop. You may tempt the driver to stop for you and run the risk of the law. If it passes you, you can glare at the conductor, who, of course, will stop for you on the other side and beckon you to come over. Turn on your heel and treat him with scorn. Wait for the next car and walk down the block a little and stop it before it comes to the corner.

Always stop a car in the middle of the street, especially if it is in full speed. Do not go to the crossings where the cars are expected to stop and are willing to do it. By stopping them at different parts of the road you retard their progress and give the driver a chance to rest. Just as a car starts, suddenly make up your mind you want to get on it. The driver will enjoy coming to a stand still again. The conductor always enjoys this.

Hail a car and have it stop while you are a good distance from it. Having done this walk leisurely toward it. You will observe the conductor, with hand on the bell-rope, leaning anxiously towards you, and the passengers looking in your direction, to say nothing of the driver gazing viciously around the corner of the car. Let none of this disturb you. Take your time and be oblivious to all the scowls about you. Do this with a sweet, placid smile. As you mount the step scowl at the conductor as though he was neglecting his business. It will nonplus him and prevent any remarks. To stop a car and then not get on it is quite the thing, and affords some amusement to all concerned. In getting on a car do so with slowness and care. Put one foot on the first step, keeping the other on the ground. This prevents the conductor from starting."

SCIENTIFIC FALL OF A BIG STACK.



ENLARGEMENT of the power house of the Cicero & Proviso Railway Company made it necessary to remove an 80-foot chimney, whose successor will be 195 feet high. The old stack interfered with the digging for the foundations for the new power-house, which will be 150 by 80 feet, and will contain two 1,000-horse-power cross-compound condensing engines made by the Edward P. Allis Company, Milwaukee, direct connected to Siemens & Halske generators. There will be room for four more installations.

There was danger of the stack pitching west, if the workmen dug under the edge, so it was decided to wreck it in order to save time. One gang of men undermined the south side. Another dug out the bricks from the north side of the base and put in the edges of steel girders. A third put in timbers above to keep the north wall from collapsing when pressure was applied. It was necessary to throw the pile of bricks south as walls shut it in on the other three sides, and it was not part of the plan to wreck them. Under the ends of the steel girders were piled heavy timbers on which were placed jack screws. Then all was ready. The foreman shouted: "Give another half-turn wid de screws, Aleck. Keep turnin'; she's begun to totter. Break away down there, she's comin'. Git outen de road, you hoboes. Scatter! Run! Now jack her up hard, boys. Yo, heave oh! Hold on, she's bucklin'. One more turn! Now stand away. Who-o-oh!" And groaning and cracking the huge stack of the Ridgeland power house toppled and broke just above the soot chamber. The shaft fell in a straight line southward in the place made for it, breaking twice in its fall.

The Akron & Cuyahoga Falls Rapid Transit Company, Akron, O., has purchased Randolph Park, which is a great resort for campers.

A MECHANICAL EDITOR MAKES A DISCOVERY.

Something More About Brakes.

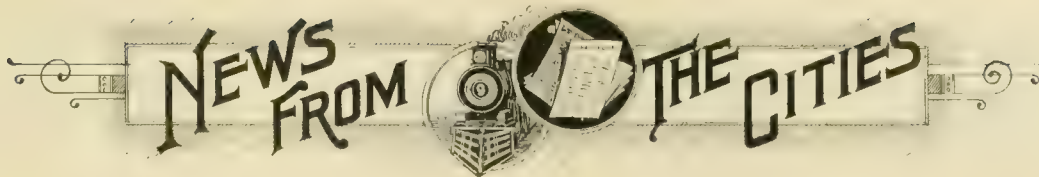
It is wonderful how street railway men will grind along with their daily toil year after year and fail to discover some things that a journalist who has practically no acquaintance with their work will find out in a few minutes.

The editor of the *American Machinist* (or his office cat—probably the latter) came out of the woods the other day and relieved himself of a long editorial on "The Problem of the Brake on the Trolley Car." He says he has been "waiting very patiently and looking very longingly," for some solution of the perplexing problem. Furthermore, he says: "We have not seen that problem considered or even enumerated by any electrical journal."

Where has he been keeping himself for the past two or three years. If he has not seen the problem considered by any electrical journal it must be because he has not read any electrical papers. There has certainly been a great deal said about street car braking both in the advertising and editorial columns of street railway and electrical papers. But a knowledge of this fact would be fatal to the original discovery which he is about to make in the course of the editorial, and which is, in substance, this: The electrical papers are aware of the slowness of the common hand brake but they do not like to say anything about it because a slow acting brake is essential to the safety of the machinery on an electric car. "The safety of the car is the prevailing consideration rather than the safety of the child that is caught under the front of it." Is it? How is it then that motormen invariably have orders to reverse rather than run over a human being? Reversing is many times harder on the machinery than the quickest brakes in existence. Going on further, he says: "Any mechanic must see at once that the brake in view of the emergency that it is supposed to provide for is a slow acting affair, and if he will investigate the propelling mechanism of the car he will easily see that it is, and why it is purposely made so. The armature of an electric motor as everybody knows is quite a heavy part of it and running at a high velocity it is of course a heavy fly wheel, and when it is noticed that the armature or the shaft which carries it is geared to the axle without the possibility of a slip the whole situation is exposed. If the axle is stopped suddenly something is going to be smashed, so the slow acting brake is a safety device for the motor. We have been wondering for some time why this matter has not been brought to the attention of the public so that the real state of affairs could be generally understood. * * * Common sense unaided can determine that an instantaneous brake is a necessity in connection with rapid transit and it should be insisted upon. The rearrangement of the motor mechanism by the application of friction clutches or other devices could be accomplished by many an engineer of the day so that there is nothing impossible to be demanded."

That editor has missed his calling. He ought to be on the staff of a daily paper, where he could unearth dark secrets like the above for the benefit of millions of the admiring populace instead of talking to a few thousand technical readers. We have traveled about much among street railway men and are acquainted with the men who are pushing the sale of improved quick acting brakes but we have never in all our experience heard of a street railway operator who objected to a quick action brake on the grounds mentioned above. The utter fallacy of the idea that a quick brake would smash something is shown every time a careless motorman skids the wheels with the hand brake when going at a moderately high speed. In such cases the armatures are stopped suddenly but nothing is broken. If the editor of the *American Machinist* can devise a successful friction clutch drive for electric motor cars, he can do more than the many eminent engineers that have worked on the problem up to date. What is most needed is a brake that will stop the wheel in the editor's head, and we would recommend that it be made "purposely slow acting" for the wheel seems to be running pretty fast and it might be dangerous to stop it too quick.

Joking aside, it may be of interest to review the history of street car braking and explain some of the real reasons why better brakes are not generally used. The crank and chain hand brake was originally adopted for horse-cars because it gave the driver more leverage in its limited working space than any other form. When horse roads began to change to electricity there were many other things to be thought of besides the brakes and as the hand brake did the work fairly well with the low speeds at first used, no one gave the matter much thought. The possibility of reversing the motor in emergency stops also tended to relieve a pressing necessity for a better brake for service stops. After a year or two, when the men who owned electric roads began to get their heads above the level of the scrap heap of electric apparatus that was the result of the earlier operations by electricity and to look after such refinements as improved brakes, there were two very important things that stood in the way. In the first place there was no improved brake and in the second place the resources of many companies were so exhausted that they could not spend much money even if a brake had been forthcoming. Soon air brakes began to appear in response to the need but their price was high. Modifications of the friction brakes used on cable roads were devised but this variety took up a good deal of room on the axle and very little attention was given to this kind of brake until recently. The electric brake is also a comparatively recent production. The past year has seen greater activity along this line than any previous. Improved brakes are coming slowly but surely, and with the recent improvements made in all classes of brakes, it is to be expected that a few years will see the complete overthrow of the now common hand brake.



Alabama.

TUSKEGEE, ALA.—An electric railway to Chehaw is proposed by a party who is said to be connected with the electric power company of Montgomery.

California.

ST. HELENA, CAL.—L. Grothwell has received electric light and railway franchises.

SAN DIEGO, CAL.—George B. Kerper will electrify the San Diego Cable Railway.

OAKLAND, CAL.—The Oakland, San Leandro & Haywards Electric Railway Company has assessed stockholders \$6 per share.

OROVILLE, CAL.—Hatch & Rock, Alexander & Hamilton, W. Treat & Son, and Reed & Johnson, are considering the construction of an electric road from Butte City.

OAKLAND, CAL.—Gen. J. A. Williamson of Washington, D. C., one of the owners of the Moraga grant is considering the construction of an electric road from Oakland to the Moraga grant.

LOS ANGELES, CAL.—The Los Angeles Consolidated Electric Railway was sold August 17, for \$1,500,000 to the bondholders. If not resold to a new company the bondholders themselves will inaugurate improvements.

LOS ANGELES, CAL.—The Los Angeles Consolidated Electric Railway Company has dropped "Consolidated and Electric" from its title. F. W. Wood, general manager, says \$500,000 will be spent on improvements, including 60 new cars, and changing all lines to electric.

SAN BERNARDINO, CAL.—The Southern California Motor Road which was in the hands of a receiver, has been sold for \$167,100 to the Pacific Improvement Company, acting in the interest of the Southern Pacific, which, it is said, will incorporate the road in the projected line from Redlands to Los Angeles.

Canada

WELLAND, ONT. A. B. Rice, Toronto, is promoting an electric railway project to Fonthill.

HALIFAX, N. S.—It is reported that the Nova Scotia Power Company has been sold at sheriff's sale for \$25,000 to the Electric Railway Company.

NIAGARA FALLS, CANADA.—Notice of incorporation has been filed for the International Belt Line Railway Company of Niagara Falls, (Limited.) Directors are A. E. Shoellkopf and Hans C. Nielson, of Niagara Falls, N. Y., John M. Brincker, of Buffalo, William Kyle of Toronto, and John Bender, Niagara Falls, Ont.

Chicago.

CHICAGO.—The Lake Street Elevated Railway has taken out a permit to build a one-story and basement brick car house to cost \$25,000.

CHICAGO.—The mortgage for \$2,500,000 on the Cicero & Proviso Street Railway Company to the Illinois Trust and Savings Bank has been placed on record.

Colorado.

DENVER, COL.—The foreclosure sale of the Denver City Cable Railway has been postponed until Sept. 10.

DENVER, COL.—The Globeville trustees have granted a franchise to the Denver, Globeville & Golden Rapid Transit Company.

DENVER, COL.—The Citizens Railway has secured franchises for 4½ miles of line. Milo Smith is president and John A. Beeler chief engineer.

DENVER, COL.—F. M. Woods, J. E. Rockwell and A. B. Heath, have formed a company with \$100,000 capital to build an electric railroad through the Garden of the Gods.

DENVER, COL.—Lewis E. Lemen, George S. Parsons, Irving F. Root, Robert C. Lingo and S. Roy Wright, of Denver, have filed articles of incorporation of the Denver, Globeville & Golden Rapid Transit Company. The intention is to build to the cities named.

DENVER, COL.—The Citizens Railway Company has been incorporated to build and operate in Boulder, Jefferson and Arapahoe counties. Capital \$500,000; incorporators, Milo A. Smith, Charles E. Hawer, E. Salisbury Smith, Clarence M. Cobb and Thomas W. Porter.

PUEBLO, COL.—The Pueblo Street Car Company has been sold to Albert E. Pattison for \$400,000. A new company known as the Pueblo Electric Street Railway Company has been formed with S. Dana Greene, president; H. E. Chubbuck, vice president and general manager; Irving Hale, secretary and treasurer.

Connecticut.

MANCHESTER, CONN.—The Hartford, Manchester & Rockville Tramway Company will make additions to rolling stock and track soon. J. L. Hall is superintendent.

District of Columbia.

WASHINGTON, D. C.—The sale of the Glen Echo Railroad which was to have taken place August 8, has been enjoined by request of the majority stockholders.

WASHINGTON, D. C.—The Washington & Great Falls Electric Railway has filed a deed of trust with the National Safe Deposit & Trust Company of Washington, to secure \$500,000 in 6 per cent bonds.

WASHINGTON, D. C.—The Washington, Woodside & Forest Glen Railway & Power Company has been incorporated. Frank J. Browning, is president; Julian C. Dowell, vice-president; Frederick Benjamin, secretary; W. Riley Dechle, treasurer.

WASHINGTON, D. C.—Surveys for the Washington, Sandy Spring & Baltimore Electric Railway Company have been completed, and the road will be 80 miles long. Four power houses will be built and specifications and plans are being prepared. James B. Colegrove, Washington, is president.

Georgia.

ATHENS, GA.—The Athens Railway Company, electric, has begun the work of developing its water power.

SAYANNAH, GA.—A meeting of stockholders of the Suburban & West End Railway has been called to consider proposed extensions.

MACON, GA.—The Macon & Indian Springs Electric Railway Company is ready to begin construction as soon as the right of way is granted.

Illinois.

LA SALLE, ILL.—The City Electric Railway will build a new power house.

FREEPORT, ILL.—The Freeport Street Railway Company has applied for franchises for extensions.



ANOTHER FENDER THAT WILL FEND.

ALTON, ILL.—An extension to Yager Park will be built by the Alton Railway & Illuminating Company.

FREEPORT, ILL.—The South Freeport & Cedarville Electric Railway Company has applied for a franchise.

KANKAKEE, ILL.—The Kankakee Electric Railway has been given a franchise to extend to the fair grounds.

ROCKFORD, ILL.—John Farson, Chicago, receiver of the West End Street Railway Company, says extensions will be built at once.

MONMOUTH, ILL.—Permission to operate an electric railway has been applied for by the Monmouth Electric Light, Power & Railroad Company.

DANVILLE, ILL.—The Danville & Northwestern Electric Railway has been organized by the election of W. W. Hatch, president, Robert Holmes, vice-president and W. S. Matthias, solicitor.

WAUKEGAN, ILL.—C. E. Loss has been granted a franchise for an electric railway, which must be in operation by January 1, from the business center to the Washburn & Moen factory district.

PEORIA, ILL.—The Central and Ft. Clark Electric Companies have been granted franchises for 20 years. The former is to pay \$5,600 and the latter \$14,000 to the city. It is said this may hasten the consolidation.

PEORIA, ILL.—The Ft. Clark Horse Railway Company (electric) has been absorbed by the Central Railway Company. As soon as the consolidation is perfected, improvements will be made, especially on the Ft. Clark road.

ALTON, ILL.—The Alton Railway & Illuminating Company, which is the consolidation of the two old companies, has elected J. F. Porter, president and manager; James Duncan, vice-president; and H. S. Baker, Jr., secretary.

JOLIET, ILL.—The Joliet Street Railway Company has given a trust deed and mortgage for \$300,000 to the Illinois Trust & Savings Bank, Chicago. The company will extend its lines, purchase new cars, and substitute heavier rails for those now in use.

DANVILLE, ILL.—The Danville & Northwestern Electric Railway Company has been incorporated with \$100,000 capital, to build an electrical railway to Potomac, Rankin, Gilman, Paxton, Sidell and Georgetown. The incorporators are William T. Cunningham, John W. Dale, William P. Chandler, W. S. Mathias, Robert Holmes, Danville; J. W. Layne, J. K. Butz, Potomac; W. W. Hatch, New York.

Indiana.

RICHMOND, IND.—On September 14, the sheriff sold the Richmond City Railway.

JEFFERSONVILLE, IND.—W. H. Williams, an electrician, is trying to make arrangements with local capitalists for the purchase and electrification of the Jeffersonville Street Railway.

FT. WAYNE, IND.—The officers of the Ft. Wayne, Lake Everett & Columbia City Street Railway are: C. E. Everett, president; William Geake, vice-president, and W. E. Doud, secretary.

FT. WAYNE, IND.—The Allen County Commissioners have given Charles E. Everett a franchise to construct the Fort Wayne, Lake Everett & Columbia City Electric Railway along the highways. Construction will begin at once.

FT. WAYNE, IND.—F. H. Norton, President of the First National Bank of Hicksville; J. B. McCullough, a banker of Ft. Wayne; James B. Colgrove, of Washington, D. C., and John H. Hart, of Hicksville, are among the incorporators of an electric road to be built through Ft. Wayne, Maysville, Hicksville, Farmer Center, Williams Center and Bryan.

Iowa.

SIOUX CITY, IA.—The Riverside Park Electric Railway will be sold September 30, under foreclosure.

DAVENPORT, IOWA.—The stockholders of the Davenport & Rock Island Railway have voted to reorganize.

CEDAR FALLS, IOWA.—The council has given C. W. McElyea a franchise to build a street railway from the business district to the State Normal School.

Louisiana.

NEW ORLEANS, LA.—The New Orleans & Carrollton Railway Company has applied for an electric railway franchise in Jefferson.

NEW ORLEANS, LA.—The Algiers & Gretna Railway Company has been granted a franchise for an electric railway from Macdonoughville to the Company Canal.

Maine.

PORTLAND, ME.—The Portland & Yarmouth Electric Railway has made application for franchises on the streets of Portland, Deering, Falmouth and Yarmouth.

BIDDEFORD, ME.—The Biddeford & Saco Railroad Company has appropriated \$100,000 for improvements. W. A. Worthington is superintendent and J. Hunt, Jr., chief engineer.

Maryland.

BALTIMORE, MD.—Plans for a large repair shop are being prepared by the Baltimore Traction Company.

BALTIMORE, MD.—Samuel M. Shoemaker will build an electric railway over his property to the Chattolantee Springs hotel.

CATONSVILLE, MD.—E. D. Smith & Son, Philadelphia, have been given the contract for the 36 miles of the Columbia & Maryland Railway Company.

BALTIMORE, MD.—William Ferguson, Joseph Henry Judick, Charles W. Dorsey, Joseph Carroll Monmonier and Levi Z. Condon, the proposed incorporators of the Wetheredville, Franklinton & Edmondson Avenue Electric Railway have applied for franchises over certain routes.

FOREST GLEN, MD.—Incorporated: the Washington, Woodside & Forest Glen Railway & Power Company to build an electric road from here to Washington. Frank J. Brownling is president, Julian C. Dowell, vice-president, W. Riley Dechle, treasurer, and Frederick Benjamin, secretary.

Massachusetts.

NEW BEDFORD, MASS.—The Union Street Railway, of Providence, R. I., and the town of Fairhaven have agreed on terms of a franchise.

HOLYOKE, MASS.—W. S. Loomis, Levi Perkins and R. B. Johnson are arranging to build an electric railway up the mountain.

ROCKDALE, MASS.—The Valley Electric Railway has applied for a franchise. Mr. Dean, of Worcester, and Mr. Brigham, Sr., of Sutton, are interested.

Haverhill, Mass.—The Haverhill, Georgetown & Danvers Electric Railway Company has petitioned for a franchise in Georgetown. It is probable that work will begin this season.

EAST WAREHAM, MASS.—Thomas B. Griffith, president of the East Wareham, Onset Bay & Point Independence Railway will retire Sept. 1. A change in the road's policy is rumored.

WORCESTER, MASS.—The North End Street Railway Company has been authorized to issue \$20,000 in bonds, and \$35,000 additional stock, and has been leased by the Consolidated Street Railway Company.

GRAFTON, MASS.—The selectmen have given the Blackstone Valley Electric Railway a franchise. Franchises having already been secured in Sutton and Millbury. Arrangements will be made to build at once. E. W. Shedd is engineer.

SOUTHRIDGE, MASS.—The Southbridge & Sturbridge Electric Street Railway Company has elected George M. Wells, Southbridge, president and A. M. Cheney, F. L. Chapin, Jacob Booth, C. W. Hill, Southbridge; C. D. Paige and Thomas T. Robinson, Boston, directors.

HANSON, MASS.—Citizens have formed a preliminary organization to obtain an electric road from Hanson to Whitman. Frank Bourne is president; William G. Elms, vice-president; Dr. Flavel S. Powers, secretary; Henry L. Powers treasurer; Ezra White, James M. Roberts, Henry A. Beal, Samuel Cox, Philip H. Barker, directors.

HANOVER, MASS.—The Hanover Street Railway Company has been organized to build. Capital stock, \$20,000; all subscribed; directors, Charles H. Killum, president; Herbert L. Curtis, secretary; Frederick H. Curtis, of Norwell, treasurer; Hon. Jedediah Dwelley, E. L. Young, Frank S. Alger, of Hanover, and Charles Stevens of Rockland.

Haverhill, Mass.—W. W. Potter and H. L. Perkins, of this city, C. E. Wood, Bradford, Walter M. Brewster, Georgetown, Merrill B. Baily, Topsfield, have been chosen directors of the Haverhill, Georgetown & Danvers Street Railway Company, incorporated with \$100,000 capital. The road will be 17 miles long and connect with the Lynn & Boston road at Danvers.

Mexico.

LERDO, MEX.—The Lerdo Street Railway will extend four miles to Torreon.

Michigan.

ANN ARBOR, MICH.—The Ann Arbor Street Railway will build an extension.

DETROIT, MICH.—The Detroit Railway will build a two story brick car stable to cost \$10,000.

OWOSSO, MICH.—Alexander Ralph, of Philadelphia, has purchased for \$5,500, at mortgage sale, the Owosso & Corunna Street Railroad.

SAGINAW, MICH.—The Saginaw & Bay City Rapid Transit Company has secured the necessary franchises so that work will begin within thirty days.

DETROIT, MICH.—Lester B. French, a real estate dealer here, and ex-Congressman W. C. Mayberry, are considering building a line along the river to Port Huron.

OWOSSO, MICH.—The Owosso & Corunna Street Railway will be put in repair by the new owner, Alexander Ralph, of Philadelphia, and later equipped with electricity.

DETROIT, MICH.—Lester B. French, 618 Hammond building, manager of construction, is ready for bids for grading and placing rail and ties for an electric road to Port Huron. The track material is purchased.

LANSING, MICH.—Major L. L. Downs, of New York, E. E. Downs, of Battle Creek and F. N. Rowley, of Kalamazoo, representing a syndicate, are looking over the road here with a view to buying from the Continental Trust Company, of New York, and thoroughly overhauling it.

GRAND RAPIDS, MICH.—The Consolidated Street Railway has elected officers as follows, several changes being made: A. J. Bowne, Grand Rapids, president; V. Shaw Kennedy, of Chicago, vice-president; O. S. Gaither, Chicago, secretary. E. M. Phelps, of Chicago, succeeds S. K. Martin as director.

DETROIT, MICH.—S. Brownell, Wm. A. Jackson and F. E. Snow have secured franchises for an electric road on Grand River avenue from Scotten and Warren avenues to Farmington, 14 miles; and in the townships of Greenfield, Redfield, West Bloomfield, Bloomfield, and Pontiac, 26 miles in all. Construction of a section near Detroit may be begun this season. The powerhouse will be on Grand River avenue and Rouge river, 11 miles from the city hall.

Minnesota.

ST. CLOUD, MINN.—E. E. Clark, assistant cashier of the First National Bank, has been appointed receiver of the St. Cloud Street Car Company.

Mississippi.

MERIDIAN, MISS.—The Poplar Springs Dummy Railway has been sold to Mrs. Simmons Jackson, Tenn., trustee. The new company will further equip and improve the service of the road.

MERIDIAN, MISS.—F. B. Merrill, New York, has been granted a franchise for an electric light plant and street railway. Five miles of electric railway must be completed April 1, 1896, and before January, 1896, the electric light plant must be in operation.

Missouri.

KIRKSVILLE, MO.—S. M. Rickler and T. J. Dockery of this place are talking electric road.

KANSAS CITY, MO.—J. D. Parkinson who was appointed to hear the claims against the People's Cable Railway, has set September 12 as the last day on which claims may be presented.

KANSAS CITY, MO.—The Kansas City & Independence Rapid Transit Company's property will be sold under foreclosure of an \$800,000 mortgage, held by the Central Loan & Trust Company of New York.

KANSAS CITY, MO.—The Electric Railway Construction Company has incorporated to build a road here. W. E. Winner, Eli S. Young, M. B. Abell, James Scammon, George Law, C. B. Adams and C. B. Leavel are subscribers to the shares.

NEVADA, MO.—The Nevada Electric Railway, Light & Park Company has been organized to build under the franchise recently granted. Capital, \$130,000; incorporators, George Dudley, Judge Mills, Selden Spencer, F. T. Allison and Dr. T. F. Prewitt, all of St. Louis, and C. F. Strohman and Col. Harry Moore, of Nevada.

ST. JOSEPH, MO.—E. A. Noyes, of Portland, Me., and Richard P. Harriman, of New York, purchasing trustee of the stockholders, have bought for \$300,000 all the property of the St. Joseph Traction & Lighting Company. The sale was made to satisfy a mortgage held by the Central Trust Company, of New York. Improvements will be made.

Nebraska.

OMAHA, NEB.—The city of Florence will hold a special election September 17, to vote on the question of giving a bonus of \$13,000 to the Omaha & Florence Street Railway. The company is led by V. G. Lantry, W. G. Clark and Fred Parker.

BEATRICE, NEB.—The Beatrice Rapid Transit Company has been sold to John A. Horbach, of Omaha, at receiver's sale. M. C. Steele, the former receiver has been made manager and extensive improvements will be made, including the laying of new track and probably the building of a new power house.

New Hampshire.

FRANKLIN, N. H.—Warren F. Daniels has formed a company to build an electric railway.

New Jersey.

CAMDEN, N. J.—The West Jersey Traction Company has been granted its franchise in Camden.

LONG BRANCH, N. J.—The Atlantic Coast Electric Railway Company has accepted its franchise.

NEW BRUNSWICK, N. J.—Press dispatches credit a Pennsylvania Railroad officer with saying that the branch from New Brunswick to Millstone will be electrically equipped.

HOLLY BEACH, N. J.—Mayor Frank Smith, John L. Burk, Wilson Banks, of this city, and George Ent, Anglesea, contemplate building an electric road connecting Anglesea, Wildwood and Holly Beach.

CAPE MAY, N. J.—The Cape May Light & Power Company has been incorporated to build a road to Stony Harbor. Alex. R. S. Springer, Cape May, is president and W. W. Hartell of Philadelphia, secretary.

ORANGE, N. J.—The Orange Mountain Cable road will be sold by Eugene Vanderpool, receiver, for the payment of receiver's certificates held by the National Newark Banking Company, and to pay the \$350,000 mortgage.

New York.

TROY, N. Y.—The Troy City Railway Company will build bridges.

ROCHESTER, N. Y.—The Rochester Railway has applied for new franchises.

NEW YORK, N. Y.—The Third Avenue Railroad has applied for franchises on $3\frac{1}{2}$ miles of street.

NEWBURGH, N. Y.—The Newburgh Electric Railway will extend from Walden to Middletown next year.

SUSQUEHANNA, N. Y.—The survey for the Susquehanna & Lanesboro Electric Street Railroad is in progress.

UTICA, N. Y.—The Utica & Herkimer Street Railway Company has been given permission to build a branch.

NEW YORK, N. Y.—The Third Avenue Railroad Company has been granted a franchise to extend its line to Kingsbridge.

COHOES, N. Y.—The Cohoes City Railway has given a mortgage of \$50,000 on its property to Hon. George Campbell and others.

LITTLE FALLS, N. Y.—The Little Falls & Richfield Springs Electric Railway has been granted the greater part of its right of way.

AUBURN, N. Y.—The Auburn City Railway and Auburn Interurban Electric Railroad have filed applications for several franchises.

GREENBUSH, N. Y.—The Albany, Greenbush & Bath Railway, of which Edward J. Duggan is president, has been given a franchise here.

NEW YORK, N. Y.—It is reported that ex-State Senator George W. Plunkitt is endeavoring to have the Eighth avenue road adopt electric traction.

GENEVA, N. Y.—It is reported that the Geneva & Waterloo Electric Railway Company will extend its line through Phelps to Clifton Springs and Canandaigua.

OWEGO, N. Y.—Col. W. E. Dorwin has revived the scheme of an electric road to Speedsville, via North Owego, Flemingville, Weltonville, North Newark and Jenksville.

HUDSON, N. Y.—The Hudson Electric Railway has made application to extend its line over the Columbia and Farmers' turnpike to the town lines of Claverack and Stockport.

SYRACUSE, N. Y.—The Syracuse Street Railroad Company has purchased the Consolidated Street Railway from the bondholders, who recently bought it in at judicial sale.

NEWBURGH, N. Y.—The Homer Ramsdell Transportation Company is reported as behind a scheme to build a road from here to New Paltz by way of the Orange lake road, now in operation.

GREENWICH, N. Y.—The Greenwich & Schuylerville Railroad Company, which was recently incorporated, will develop the water power at Middle Falls, on the Rutenkill and build a supplementary steam plant.

TRIBES HILL, N. Y.—James Shanahan, Jr., Tribes Hill, Montgomery county, N. Y., is in the market for 800 tons of second hand T rail, 56 to 65 pounds, in good condition. Delivery at Fonda, N. Y., on New York Central.

WATERTOWN, N. Y.—The car barns of the Watertown & Brownsville Street Railway Company were destroyed by fire early on the morning of August 22, together with a motor car and trailer. Loss \$7,500; no insurance.

OWEGO, N. Y.—W. E. Dorwin writes that the electric road from Owego to Speedsville will be 16 miles and use 60 pound T rail on 15 miles, and a flat flange rail over one mile. The largest part of the business of the road will be hauling milk.

PATCHOGUE, N. Y.—At a meeting in the interests of the proposed electric road, 14 miles long, to Port Jefferson, it was decided to go ahead, and the secretary, Joseph B. Swezey was directed to correspond with manufacturers of machinery and material.

NEW YORK, N. Y.—It is reported that the Metropolitan Street Railway Company will adopt the underground system in operation on the Lenox Avenue line for all its horse lines. Cost of construction will be lessened by building a lighter conduit than in Lenox Avenue.

SYRACUSE, N. Y.—The property of the Syracuse Consolidated Street Railway has been sold by foreclosure proceedings to Frederick F. Strauss, representing a committee of the New York bondholders, for \$865,000. The purchasers say they will re-equip the whole system.

ONEIDA, N. Y.—W. H. Harmon and James Malone, of Oswego; Charles Dexter and J. H. Sullivan, of Fulton; and Charles Thompson, of New York, are considering the purchase of the Hard Spring Bed factory here, with a view to converting it into a car and truck works.

LOCKPORT, N. Y.—Charles A. Johnson, Reed & McKibbin and others are said to be interested in a project to build extensive interurban lines, connecting Buffalo, Williamsville, Swormsville, Lockport and Olcott, to be known as the Buffalo, Lockport & Lake Ontario Railroad.

CLYDE, N. Y.—The Niagara Falls Electric Company, Niagara Falls, has made an offer to build an extension to the towns of Galen, Rose and Huron for a bonus of \$10,000. The new road would connect with the Central Hudson Railroad at Clyde, and with the Rome, Watertown & Ogdensburg at North Rose.

ALBANY, N. Y.—H. Schoolcraft, E. Twitchell, T. J. Ward, J. M. Erwin, Mel. Bershwick, Dr. Crounse, L. C. Warner, H. Finckel, Mr. Kromer, Benj. Secor, Mr. Brooks and others, who are interested in the Albany, Helderberg & Schoharie Electric Railway, have had a meeting and subscribed nearly enough stock for organization.

STAPLETON, N. Y.—It is reported that James C. Hinchcliffe, Pater-son, N. J., Benjamin E. T. Throop, W. B. Rockwell, C. G. Wightman, M. J. Wightman, who are interested in electric railways at Middletown, N. Y., and Scranton, Pa., have bought the Midland Railway, extending from Stapleton and West Brighton to the interior of the island, and will adopt electric traction.

NEW YORK, N. Y.—The Hoboken Railroad Warehouse & Steamboat Connecting Company, through Col. E. A. Stevens, has petitioned the Hoboken city council for an electric railway franchise from the steamship docks to the tracks of the Junction and the Erie Railroad Companies. The line when completed, will enable the bulk of the western traffic of the steamship lines to go over the West Shore.

LEWISTON, N. Y.—The Lewiston & Youngstown Frontier Railway Company has been incorporated with \$60,000 capital by O. P. Letchworth, Frank M. Hayes, Henry C. Howard, A. J. Wheeler, Edwin T. Evans, L. D. Rumsey, F. R. March, Joseph L. Hunsicker, Buffalo; A. H. Dutton, Youngstown. It will be an electric road six miles long from Porter, north of Youngstown to Lewiston, all in Niagara county, with principal offices at Buffalo.

PORT CHESTER, N. Y.—The Port Chester, Rye, Harrison & White Plains Electric Railroad Company has been incorporated with \$50,000 capital; incorporators, John W. Lounsberry, Port Chester; John Duffy, White Plains; John O. Merritt, Port Chester; William Ryan, Port Chester; Hanford M. Henderson, Port Chester; William L. Ward, Port Chester; John W. McCarty, Port Chester; Charles D. Haines, Kinderhook; Ebenezer Bull, Harrison; John O. Rourke, White Plains; Frank Schrimmer, White Plains.

GREENPORT, N. Y.—The Columbia County Electric Railway Company has been incorporated with a capital of \$400,000 to operate a street surface electric road, a distance of fifteen miles, between Hudson, Philmont, and Stockport Station. Directors, Hiram McGonegal, of New York City, Walter S. Wales, of Syracuse, and A. J. Rowles, E. J. Hodge, Charles S. Rogers, William H. Van Tassel, Henry H. Smith, Sheldon B. Cook, and William J. Phillips, of Hudson. The company's principal office will be in the town of Greenport, Columbia county.

ALBANY, N. Y.—The Albany, Helderberg & Schoharie Railway Company, which was recently organized with \$350,000 capital, to build a freight and passenger line to be operated by electricity, compressed air or steam, has elected directors as follows: John W. Van Valkenburgh, president; Jonas H. Brooks, vice president; Theodore Little, treasurer; W. H. Erwin, secretary; L. C. Warner and Benjamin M. Secor, of Albany; Dr. O. C. Snyder and Jacob Kelsh, of Gallupville; C. E. Dietz and T. J. Wood, of Berne; J. M. Ervin, of New Salem; Dr. C. J. Crounse, of Clarksville; Harrison Tinkle, of Greenbush, and E. Twitchell and C. Cromer, of Schoharie.

Ohio.

LANCASTER, O.—The Lancaster Street Railway has been sold.

DEFIANCE, O.—Hon. John W. Winn is interested in a proposed trolley road.

LIMA, O.—The Lima Electric Railway has secured an ordinance for extensions.

ELYRIA, O.—James L. Mauldin, Cleveland, has secured franchises for an electric line to Lorain.

MASSILLON, O.—The Canton & Wooster Railway Company has been incorporated with \$10,000 capital.

NEWARK, O.—Robert De Bois, an attorney of Columbus, is looking after the Columbus & Newark Electric Road.

YOUNGSTOWN, O.—The Park & Falls Electric Railway is reported as intending to build to the coal fields, 8 miles south of here.

WARREN, O.—The Trumbull Electric Railroad Company has been granted a franchise for an electric line from Warren to Leavittsburg.

CLEVELAND, O.—The Wooster, Medina & Cleveland Street Railway has been incorporated by L. P. Ohliger, J. R. Simmerman and others.

WARREN, O.—The Trumbull Electric Railroad Company has accepted the franchise granted by the County Commissioners and will file a \$10,000 bond.



"Could ye direct me to Pat McMann's in—"

"Howdy Masses! This day is got to be of the truth and a bond of a forgettable to pull me through that rank in the state."

SAVANNAH, O.—T. Y. McCray and Nelson Ozier, Mansfield, are working on an electric railway project from Wellington to Mansfield, touching this place.

AKRON, O.—W. A. Lynch, of Canton, and the Canton & Massillon Interurban line, are backing the Akron, Bedford and Cleveland interurban electric railway.

PAINESVILLE, O.—Hon. Martin Dodge, of Cleveland, has been interviewing citizens here about building an electric road from Cook's Corners to Little Mountain.

TIFFIN, O.—The Tiffin-Fostoria Electric Railway was offered at sheriff's sale August 19, without receiving a bid. About \$30,000 has been expended on its construction.

CLEVELAND, O.—The council has extended the time of the Painesville, Fairport & Richmond Street Railway franchise to July 1, 1896, for which the city receives \$1,000 cash.

GALLIPOLIS, O.—The Gallipolis & Point Pleasant Railway Company has been incorporated with \$50,000 capital by John L. Vance, H. C. Johnston, L. E. Jones, L. H. Cott, C. B. Duff.

WILLOUGHBY, LAKE COUNTY, O.—The Yale Transit Company has been incorporated with \$210,000 capital, by R. R. Rhodes, W. C. Rhodes, Robert Wallace, John H. Bartow and Frank S. Masten.

TOLEDO, O.—Mayor Guy G. Major, is president of the Cincinnati, Middletown & Dayton Traction Company. Ten miles of the road have been completed. Work will be begun on the remainder this fall.

WADSWORTH, O.—The Wadsworth Electric Railway Company is in the market for overhead material for eleven miles of track, and machinery for an arc plant of 1,600 c.p. and a 900 c.p. incandescent plant with poles, wire, switches, etc.

WARREN, O.—The commissioners of Geauga county have granted the Cleveland-Kinsman Electric Railway Company a franchise to pass through the county. The line is an extension of the Cuyahoga suburban, being built to Chagrin Falls.

CLEVELAND, O.—James L. Mauldin, president of the Eastern Electrical Equipment Company, writes that within 60 days he expects to be ready to let contracts for electrical equipment for an interurban system covering 45 miles, and touching Elyria and Lorain.

CLEVELAND, O.—The Akron, Bedford & Cleveland electric line is to be extended to Kent and Ravenna, the commissioners of Portage county having granted an application for a franchise on the main road through Kent to Ravenna, with branches to Brady and Sandy lakes.

NEW PHILADELPHIA, O.—The Springfield, Clifton, Cedarville & Jamestown Electric Railway Company has decided to begin construction March 1, 1896, having been delayed in securing some private right of way. Harry L. Canfield, engineer, New Philadelphia, is preparing plans and will promptly answer all correspondence.

WOOSTER, O.—The Wooster, Medina & Cleveland Electric Street Railway Company has organized by electing C. V. Hodd, Wooster, president; F. H. Hawley, Medina, secretary; directors, Crosby Thomp-



Judge Everkick when asked to take the next car.

Judge Everkick when the conductor wants to stop for another passenger.

son, Cleveland; R. H. McDowell, J. Andrews, Medina; Warden Wheeler, Creston; W. J. Mullins, A. Cunningham, L. P. Ohliger, C. W. Kauke, Wooster. Construction is promised to begin soon.

Oregon.

PORTLAND, ORE.—C. E. Smith, and others have been granted an electric railway franchise.

PORTLAND, ORE.—The Portland Traction Company has been given permission to extend its cable road

PORTLAND, ORE.—C. E. Smith and Graham Glass, who were granted a franchise for an electric road on First street, will take over the horse line on that street, now in receiver's hands, and change to electricity.

PORTLAND, ORE.—The Portland & Western Railway Company has been incorporated with \$25,000 capital to build an electric road in Washington county, by S. J. Mitchell, W. F. Nelson, Frederick V. Holman

PORTLAND, ORE.—W. F. and L. T. Nelson and George W. Joseph, have incorporated the Portland & Hillsboro Construction Company with \$10,000 capital to acquire the Barnes Heights & Cornell Mountain Railway, and to construct and equip electric lines elsewhere in Oregon.

Pennsylvania.

CHESTER, PA.—The People's Electric Railway Company has been granted a franchise by Upland Borough

SPRING LAKE, PA.—The council has given a franchise through the borough to the Asbury Park & Belmar Railroad.

CAMBRIDGE, PA.—The Cambridge & Edinboro Electric Railway Company has been granted a franchise and work must begin within six months.

PHILLIPSBURG, PA.—The foundations for the power house and car barns of the Phillipsburg Electric Railway have been seized by the sheriff.

MEADVILLE, PA.—John J. and F. R. Shryock, of the People's Incandescent Light Company, talk of building an electric railway to Edinboro.

APOLLO, PA.—George W. Kendrick is in the market for everything required to construct and equip $2\frac{1}{2}$ miles of electric road, including barn.

PHILADELPHIA, PA.—The Moyamensing Avenue & Penrose Ferry Passenger Railway Company has been granted an electric railway franchise.

SCRANTON, PA.—The Scranton & Pittston Traction Company can now build the two miles between Rendham and Duryea, as the injunction is off.

CARBONDALE, PA.—The Carbondale Traction Company's property, real and personal, has been ordered sold to satisfy a judgment for \$800 due William May.

PITTSBURG, PA.—It is reported that the Pittsburg, Shenango & Lake Erie Railroad will adopt electric traction on its line from Meadville to Linesville Junction.

McKEESPORT, PA.—The McKeesport & Port Vue Passenger Railway Company will build a 9-mile electric line over the proposed new highway to Rostraver.

ALLENTOWN, PA.—Suit to recover \$25,000 of promissory notes has been brought against the Allentown & Bethlehem Rapid Transit Company by the Industrial Improvement Company of New Jersey.

DUNMORE, PA.—Franchises have been asked for by the Dunmore Street Railway Company. Capital, \$75,000; incorporators, P. J. Horan, president; J. H. Burns, E. J. Lynett, T. E. Boland and M. J. Sweeney. The road will extend from Scranton to Carbondale.

ALLENTOWN, PA.—A. E. Whitney, of Allentown, is president of the newly incorporated North Susquehanna Traction Company, with \$125,000 capital, which is to build an electric road between Danville, Bloomsburg and Espy, with branches to Riverside, Rupert and Catawissa.

POTTSVILLE, PA.—The Schuylkill Electric Railway Company will commence at once to make extensions of their Pottsville and Minersville lines to Schuylkill Haven and Hecksherville. The company has been contemplating making these extensions for some time.

HARRISBURG, PA.—Charters have been granted to the Allegheny & Chartiers Railway Company, to run from Esplenborough to Allegheny City; capital, \$15,000; and the Franklin & Oil City Rapid Transit Railway Company, to run from Franklin to Oil City; capital, \$70,000.

PITTSBURG, PA.—Alexander Brown & Sons, bankers, of Baltimore, are, it is said, furnishing \$4,000,000 capital to the Second Avenue Traction Company, wherewith to construct a great interurban electric railway line, 200 miles long, passing through Sewickley, Rochester, East Liverpool, Toronto, Steubenville, and Wheeling, thence across the country by the old National pike through the towns of Washington and Brownsville to the Upper Monongahela River, and down that stream to McKeesport to a junction with the present terminus of the Second Avenue Traction Company.

Rhode Island.

WOONSOCKET, R. I.—The Woonsocket Street Railway has secured a franchise from the Cumberland town council for its Manville extension.

Tennessee.

KNOXVILLE, TENN.—Franchises have been granted the new Citizens' Street Railway Company.

JACKSON, TENN.—The Jackson & Suburban Street Railway Company will adopt electric traction.

KNOXVILLE, TENN.—The Knoxville Street Railway Company will erect an office building, power house and car stables.

CHATTANOOGA, TENN.—The Chattanooga Electric Street Railway Company has been granted permission to enter upon the Chickamauga Park limits.

KNOXVILLE, TENN.—The Citizens' Railway Company has been incorporated to build and operate an electric line, possibly in connection with the West End electric and the Fountain City dummy. Incorporators, W. G. McAdoo, Jr., F. K. Huger, George W. Henderson, R. H. Sanson, E. T. Sanford and T. H. Heald.

Texas.

DALLAS, TEX.—E. L. Wood and C. B. Leslie are reported to be promoting an electric railway project to Oak Lawn.

HOUSTON, TEX.—The Houston Heights Street Railway Company has elected Carroll M. Carter, president; O. M. Carter, vice-president and treasurer; E. B. Cooley, secretary.

Virginia.

RICHMOND, VA.—The Richmond Traction Company (the new corporation) has been voted the Broad street franchise in preference to the Richmond City Railway.

Washington.

SEATTLE, WASH.—M. F. Backus, receiver of the Consolidated Street Railway Company, is having plans and specifications prepared for the reconstruction of the power house.

SEATTLE, WASH.—Receiver W. J. Grambs, of the Ranier Avenue Electric Railway, has been given permission by the court to pay the certificates issued on account of supplies, etc.

CHELAN, WASH.—J. F. Baker, of the Chelan Bank, has bought a 40-acre tract, embracing the water power of the falls, which he will improve to generate electric power for a new line of street railway.

CASTLE ROCK, WASH.—The Mount Helen's Railway Company has been incorporated with \$500,000 capital by Milton Santee, B. A. Deetz, L. G. Bigelow, to build an electric road to the mining region of Skamania county.

Wisconsin.

LA CROSSE, WIS.—The La Crosse City Railway has been granted new franchises.

MARINETTE, WIS.—A franchise for an extension has been granted the Marinette Electric Light & Street Railway Company.

SHEBOYGAN, WIS.—A franchise to build an electric railway has been granted the Sheboygan, St. Paul & Central Railroad Company.

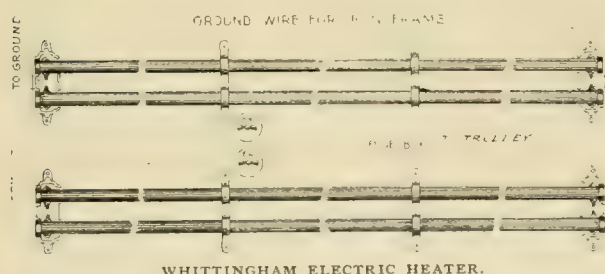
MILWAUKEE, WIS.—The committee on railroads of the city council has recommended the adoption of the McGann Company's ordinance.

MILWAUKEE, WIS.—The change of the Whitefish Bay Dummy line from steam to electricity has been recommended to the Milwaukee Street Railway, by General Manager Wyman, and it will probably take place early in the spring.

APPLETON, WIS.—A. L. Smith, president of the company, has been appointed receiver of the Appleton Edison Electric Company, on application of the New York Security & Trust Company, which holds a \$75,000 mortgage. The liabilities are \$111,930.

WHITTINGHAM ELECTRIC HEATERS.

To use its own language the Whittingham Electric Car Heating Company advocates a radical departure from the "waffle iron" and "resistance box" type of electric heaters with which electric railway people are familiar. The Whittingham heater is developed along the line of steam heating apparatus, thereby increasing the radiating surface and decreasing the surface temperature. The heater



is composed of wrought iron pipes running the length of the car. Each pipe contains a coil of wire enclosed in a heat-conducting, insulating tube. The wire and its tube are then put in the wrought iron pipe and the pipe packed with pure silica. The temperature of the outside of the pipe never rises above 180 degrees, and so is perfectly safe for the woodwork. As the wire is entirely enclosed in an insulating medium there is little danger of a burn-out.

WANTS \$150,000 OF A RAILWAY PRESIDENT.

A breach of promise suit for \$150,000 damages has been brought against George Law, president of the Eighth Avenue road, New York City. The complainant is a Miss Mack to whom current report said Mr. Law was engaged. Last September Mr. Law married a



GEORGE LAW.

Miss Smith who was introduced to him by Miss Mack. Mr. Law is a prominent character in New York, very wealthy, has a magnificent steam yacht, is quite an athlete, and takes great interest in pugilists.

George Law is a man with a peculiar history. His father, the late George Law, amassed a fortune by shrewd dealings in street railroads. Young George was graduated from the Columbia College Law school, but never practised his profession. Instead he went to work driving a car on his father's railroad, and worked his way up in the business, so that when his father died he was well fitted to step into his place as president of his various railroads. His age is now something less than fifty years, and he is tall, portly and jolly.

Robert G. Ingersoll is attorney for Miss Mack.

NO TRAILERS FOR THE CLEVELAND ELECTRIC.

The Cleveland Electric Railway has decided to do away with trailers. During the past year the company has put in service 60 combination cars, and John J. Stanley, the general superintendent, says that in buying cars in future they will be combinations, which will retire a corresponding number of trailers. In operating a motor and trail car at present, one conductor has charge of both except during the morning rush from 6 to 9 o'clock and from 4 to 7 o'clock in the evening, during which time the trailer carries its own conductor.

ADVERTISING IN THE SKY.

Managers of pleasure resorts are in position to adopt the scheme now employed nightly in New York City, whereby a big soap firm sends up a balloon each night after dusk. The balloon is inflated with gas and securely anchored by a wire several feet long. The wire also carries the current to light the incandescent lamps in an illuminated sign hung from the balloon. It attracts a great deal of attention, as on a dark night the balloon cannot be seen. A comparatively small balloon is sufficient to support the sign, which can be used to announce special attractions, the name of the resort, or any feature which may occur to the manager to advertise.

EDWARDS FENDER.

This fender is simple and neat in construction, yet very durable and strong. The manufacturer is the Albert Edwards Car Fender Company of Brooklyn, N. Y., in which city it has been successfully tried. It



FIG. 1.

consists of side arms attached to the front platform, supporting a swing frame filled with wire netting. This frame is arranged to tilt, so as to form a pocket, which



FIG. 2.

holds persons picked up and prevents them from being thrown away from the fender by the force of the blow. The front edge, which strikes a person first, consists of a spiral spring which forms a buffer. The wire netting has a smooth surface and is a peculiar feature of this company's work. Figure 1 shows the position of the fender when in use. Figure 2 shows the position of the fender when catching a person, and Figure 3 the position when folded. The tilting or swinging frame is balanced or pivoted on the front extremity of the two side bars, the front being kept close to the ground by its greater weight. If the car oscillates the fender still maintains its position near the ground. High paving blocks or other obstructions are struck by the spiral

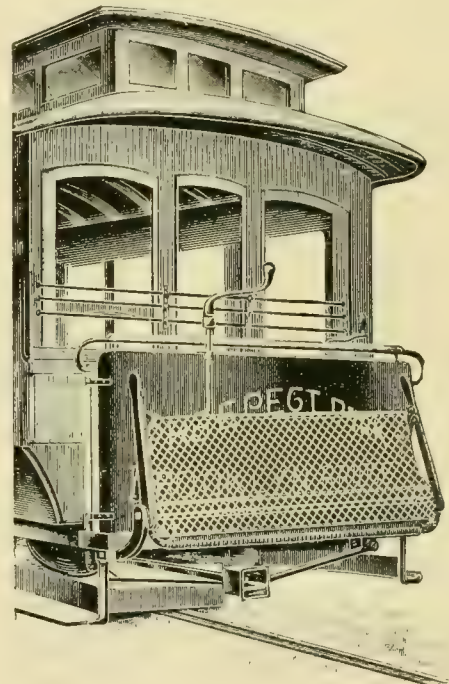


FIG. 3.

spring buffer and the fender is raised over them. Numerous tests of the fender have been made in Brooklyn, and on one occasion the manufacturer of the fender stepped in front of a moving car and was picked up without a bruise.

HORSE CARS IN CLEVELAND NOW HISTORICAL.

Cleveland, which ten years ago was making its first experiments in electric railroading, while all the world looked on and knowingly witnessed their failure, has practically been freed from the horse car service for a long time. A few old bob-tailed relics have, however, been in use on the Cleveland city cable lines as an owl service when the cable shut down after midnight. Even these are now put on the retired list, as the cables will run until three in the morning and no service will be furnished from that hour until the ropes start again at 5 o'clock.

STREET RAILWAY PLEASURE RESORTS.

FOURTH ARTICLE.

In some cities it may be possible to introduce features at street railway resorts, which resemble those in the illustration. These sketches were made at Manhattan Beach, near Chicago, on the lines of the South Chicago City Railway Company and the Illinois Central. Thousands of people are drawn there in the summer, especially on Saturday and Sunday, so that it resembles Coney Island, although on a much smaller scale. The South Chicago City Railway operates two lines of cars to the beach, landing the crowds at the bathing establishments which are within a few feet of its terminal loop. The

Another favorite pastime is "hoop" "or ring" diving. A pneumatic bicycle tire is inflated and placed on the water and the swimmer aims to dive through it without carrying the tire below the surface. Spring boards, all kinds of swings, tub and boat races furnish their quota of the fun. Any and all of these devices are very simple and inexpensive and can readily be installed by any street railway that has water and bathing resorts, or the place to make one on its lines. The concessions from stands will more than pay all the expense necessary to carry out what we have outlined, the first year.

The Anderson Street Railway Company, Anderson, Ind., had an aeronautical exhibition for one of its attractions at Shadyside Park.



PLEASURE RESORT ATTRACTIONS.

leaning tower and high tower find favor with only the most venturesome, yet all comers like to watch the graceful divers who do find pleasure in it. The trolley dive and toboggan slide are prime favorites.

A platform of any desired height is erected reached by stairs. Platforms should be large enough to hold three or four persons. A half inch wire cable is securely anchored to a tree or post in the ground and passing over the platform slopes down and out 200 or 300 feet into the water where it is made fast to frame or piling. The trolley is very simple and cannot leave the rope, and from it a short piece of rope depends to which is attached either a steel ring or two rope loops through which the hands are thrust. The voyager then swings out in mid air and with a constantly increasing speed glides down the rope and far out over the water ending in a plunge. It is very exciting and great sport both for the bathers and visitors.

On August 13th the Cortland & Homer Traction Company, Cortland, N. Y., opened its park.

The Syracuse & East Side Railway Company, Syracuse, N. Y., opened Greenway Park of 51 acres.

The Columbus Central Street Railway Company, Columbus, O., is spending \$100,000 on Minerva Park.

The Shamokin & Mt. Carmel Electric Railway Company, Shamokin, Pa., built a \$9,000 pavilion at its park at Maysville.

The Delaware Electric Street Railway Company, Delaware, O., entertained visitors to its park with a number of trained storks.

The Youngstown Street Railway Company, Youngstown, O., has carried a great many people to Mill Creek Park this season.

The Oil City Electric Street Railway Company, Oil City, Pa., has a park which has become the chief pleasure resort of the city.

The Newburgh Electric Railway Company, Newburgh; N. Y., has been giving sacred concerts on Sunday at its park. They have been popular.

The Marinette Gas, Electric Light & Street Railway Company, Marinette, Wis., has opened a new park. Boating and bathing are the principal attractions.

Arcade Park has been purchased by the Freeport Street Railway Company, Freeport, Ill. A toboggan slide will be built and a skating rink maintained this winter.

The People's Traction Company, Philadelphia, has purchased an estate in the suburbs, which is at the terminus of the Germantown and Chestnut Hill branch of the road.

The Vincennes Citizens Street Railway Company, Vincennes, Ind., at one of its regular band concerts introduced a series of living pictures and statue posing by prominent society ladies.

The Woonsocket Street Railway Company, Woonsocket, R. I., has done a big business this summer on account of concerts at Central Park. A large star of incandescent lamps gave light to the musicians.

The Worcester Construction Company, Worcester, Mass., has turned the Bangor, Orono & Old Town Electric Railway Company, Bangor, Me., over to its owners, who are operating it, and receiving hearty support.

With Ontario Beach, Charlotte, Windsor Beach, Summerville and Manitou Beach, Rochester, N. Y. has so many beautiful places to tempt visitors, that there were were rumors of a rate war by the transportation companies.

The Winchester Avenue Railroad, New Haven, Conn., maintains Saven Rock Railroad Grove on a magnificent scale. Nine thousand dollars was paid for one week's exhibition of the Fall of Pompeii, and \$10,000 for other attractions including the Innes and Gilmore bands.

MYSTERIOUS CAR MOTOR.

Glasgow, Scotland, is deeply interested in a new street car motor, the principles of which have not been made public. A box 2 by 3 feet, on the front platform, contains the motor, which is said to be "a combination of steam and electricity (?) but neither smoke nor steam are visible, and the car glides noiselessly along the streets." As tried on the city lines the car weighs $3\frac{1}{2}$ tons when charged for 12 hours running. G. Johnston, a Glasgow engineer is the inventor.

PENNSYLVANIA STATE MEETING.

The fourth annual meeting of the Pennsylvania Street Railway Association was held in the Ninth Regiment Armory, Wilkes Barre, on September 4th and 5th. Mayor Nichols delivered the welcoming address to which ex-Mayor Kenney, of Reading, responded. An interesting paper on "Power Consumption by Electric Railways" was presented by A. K. Baylor, of the General Electric, and discussed. "The Law of Street Railways" was the topic for general discussion. The remaining hours of Wednesday were devoted to conference and closed with election of following officers:—

President, B. F. Myers, Wilkes-Barre & Wyoming Valley.

Vice-president, John Lloyd, Altoona City Passenger Railway.

2nd-Vice-president, R. E. Wright, Allentown & Lehigh Valley Traction.

Secretary, S. P. Light, Lebanon & Annville.

Treasurer, W. H. Lanius, York Street Railway.

In the evening a complimentary concert was given at Hanover Park, by the Ninth Regiment band. Thursday was devoted to an inspection of the supply exhibits and an excursion over the lines of the Wilkes-Barre & Wyoming Valley, with lunch at Hanover Park.

EXHIBITS.

Atlanta Refining Company, H. W. Johns Company, asbestos line material, St. Louis Register Company, Quaker City Rubber Company, Tide Water Oil Company, Forest City Electric Company, Consolidated Car Heating Company.

DELEGATES PRESENT.

E. H. Davis and J. W. Cochran, Williamsport Passenger Railway Company, Williamsport.

W. H. Lanius, York Street Railway Company, York.

J. A. Bonnell, Carbon County Electric Railway Company, Mauch Chunk.

F. B. Musser, A. Markle and G. W. Thompson, Lehigh Valley Traction Company, Hazleton.

J. F. Ostrom, East Harrisburg Passenger Railway Company.

F. Bent, Harrisburg.

J. A. Rigg, J. R. Kenney and A. B. Arrowsmith, Reading Traction Company.

E. W. Ash, Schuylkill Traction Company, Girardville.

W. S. Duckett, City Passenger Railway Company, Altoona.

S. P. Light, Lebanon & Annville Street Railway Company, Lebanon.

W. M. Hayes, West Chester Street Railway Company.

John Graham, B. Meyers, A. W. Hollingback, James Fagen, W. G. Eno, J. C. Meixell and John Clifford, Wilkes-Barre & Wyoming Valley Traction Company.

OTHERS PRESENT.

David T. Dickson, E. M. French, J. W. Perry, Charles T. Grier, Philadelphia, Quaker City Rubber Company.

John C. Dolph, Forest City Electric Company.

H. N. Ransom, Consolidated Car Heating Company.

G. S. Allison, New York; St. Louis Register Company.

W. B. Durfee, Jr., Boston, Composite Brake Shoe Company.

Jay Wiley, New York, Western Electric Company.

Charles J. Mayer, Philadelphia, Nuttall Company.

Henry C. Dick, Newark, Flood & Conklin Varnish Company.

Arthur H. Allen, Philadelphia, Westinghouse Electric & Manufacturing Company.

William H. Heulings, Jr., Philadelphia, J. G. Brill Company.

Walter E. Harrington, Philadelphia, Cutter Electrical & Manufacturing Company.

John S. Pugh, New York, John Stephenson Company.

Frank Mansfield, Philadelphia, Breese & Mansfield Company.

F. D. Russell, Rochester Car Wheel Company.

George C. Morse, Rochester Car Wheel Company.

H. J. Crowley, Philadelphia, General Electric Company.

Frederick A. Keyes, Philadelphia, Washburn & Moen Company.
 A. K. Baylor, Schenectady, General Electric Company.
 John H. Yardley, Philadelphia Car Wheel Company.
 Frank A. Magee, New York, E. S. Greeley & Company.
 S. L. Nicholson, Philadelphia, James Boyd & Bro.
 J. A. Hanna, New York, McGuire Manufacturing Company.
 A. C. Vasburg, Syracuse, New Process Raw Hide Company.
 Theo. H. Dibble, Scranton, Washburn & Moen Company.
 John F. Ostrom, Philadelphia Pennsylvania Steel Company.
 E. F. DeWitt, Lansingburg, DeWitt & Company.
 F. A. Lex, Philadelphia, A. Whitney & Sons.
 F. S. Kenfield, Chicago, STREET RAILWAY REVIEW.
 S. H. Goddard, New York, Electrical Review.
 H. W. Blake, New York, Street Railway Journal.
 J. W. Dickerson, New York, Electric Railway Gazette.
 W. K. Beard and F. B. Vandegrift, Philadelphia, The Car.

BICYCLES AT BUTTE.

There are exceptions to all rules. What we said about bicycles being a nuisance, scratching paint and other fearful things does not apply to Butte, Mont.



The consolidated lines at Butte are probably the only ones in the country which are actually helped by bicycle riding. But they are, and the ready appreciation of the situation by J. R. Wheaton, the general manager, (who kindly took the photograph for the illustration expressly for the REVIEW) has been turned to good account.

Butte is a "city set on a hill" or rather on a big mountain, and the cyclists who want good roads have to come down into the valley, and Mr. Wheaton carries them down and up by the hundred. He placed hooks all around his cars on one line and the novel scene presented in our illustration is an almost hourly sight. Twenty and even more wheels are frequently carried at one time. No extra charge is made for the wheels;—only the regular fare for the "wheelers." It's rank heresy we know, but not many of the damsels who go

scorching around Chicago in bloomers and other inflated garments compare in looks with those fair daughters of the Rockies.

HAS CONDEMNED USE OF TRACKS.

Basing its action upon Judge Tuley's decision, which was reported in full in the August REVIEW, the West and South Towns Street Railway Company has begun condemnation proceedings, under the Horse and Dummy act, for the right to use the tracks of the Chicago City Railway Company in Twenty-second street from the Chicago river to Wabash avenue. The Chicago General Company has begun suit for \$1,000 damages against the John Spry Lumber Company for driving its wagons upon the rails of the company. C. L. Bonney, vice president of the street railway company, says it is proposed to have every right and supposed right of street railway

companies in Chicago determined by courts of last resort before the legal fight is ended.

The West and South Towns Company would like to get down to the center of the city from Twenty-second street over the Wabash avenue line, or the State street line of the Chicago City Railway Company, but as these lines are equipped with cable, the action would be more complicated than the one just begun, for the tracks in Twenty-second street are only for horse cars. There is a cable line in Twenty-second street from Wabash to Cottage Grove avenue, but the suit will not cover the tracks beyond Wabash avenue.

Mr. Bonney says the City Railway Company will be compelled to defend its charter rights, and that this suit will be of far more importance than the one that was decided by Judge Tuley. So far there is only one case

in Illinois where one street railway began proceedings to condemn the use of the tracks of another street railway company, which happened about 20 years ago, when the Central City Horse Railway Company, of Peoria, endeavored to obtain the use of the tracks of the Ft. Clark Horse Railway Company. This case is reported in the 108 Ill. 274. The court said: "In this case one horse railway company was seeking to appropriate and condemn the central part of the track and fixtures, or substantially that, of a rival horse railway company, leaving the ends unaffected, and it was held that this was a substantial destruction of the railway and could not, therefore, be tolerated."

Mr. Bonney says his company does not propose to do as the Central City Company did, for it intends to condemn the use of the entire line. He feels certain that he will win the case, as there have been many cases in other states, especially in Ohio and Massachusetts, where the rights of street railways to condemn the use of tracks of other companies has been established. This case will be under the direction of John S. Miller.

In the other case the rights of wagons and other vehicles to use the tracks without compensation to the street railway will be tested. Heretofore such cases have been brought in police and justice courts under a city ordinance where the penalty was usually a \$5 fine, that was secured at an expense of \$25 to the street railway. Under Judge Tuley's decision the company thinks it can collect compensation from owners of vehicles. The points made in the declaration in the suit against the John Spry Lumber Company, which is a wealthy corporation, are: That the railway is lawfully possessed and holds an easement and vested right in the street, and a property right in the rails, railway materials and railway tracks laid down thereon, with the right to use them of which it cannot be deprived except upon just compensation, ascertained and paid as provided by law; that the defendant nor any person had, or could acquire, without ascertainment and payment of compensation any right whatever to use the rails or any part of them, either to the exclusion of, or in common with the street railway; that the use of tracks by defendant obstructed them, and prevented the cars from running thereon contrary to the ordinances; that demand was made for \$1,000 compensation and defendant promised to pay it but later refused.

The People's Traction Company, Philadelphia, has purchased 21 acres at one of its terminals which it will call Mermaid Park. A hotel is to be built.

Messrs. Peter J. Somers, Turner, Bloodgood, and Kemper are reported to be about to begin proceedings to have the receivership of the Milwaukee Street Railway set aside. It is alleged that the bondholders of the company who applied for a receivership were also stockholders and that the bonds and stocks issued them on the formation of the company do not represent an actual cash investment of the amount which they represent.

WESTERN CURVE DECISION.

It is not trespass to build a street railway curve within two feet of a curb line in Kansas City. Michael Nugent began an injunction suit to restrain the Metropolitan Street Railway Company, Kansas City, from building its proposed line around the corner of Twelfth and Wyoming streets so near to the curbing and catch basin (it being only about two feet from the curb line), as to injure and damage Nugent's property.

Kansas City operates under a special charter, and Missouri has many laws applicable to cities of different classes. The supreme court has recently decided that Kansas City and its inhabitants only have the right to legislate upon such questions as arise under the charter and affect its interests. Section 1825 of the Revised Statutes of Missouri, 1889, contains the following:

Before taking or damaging any property in the construction of a railroad under such franchise, the said corporation shall cause to be ascertained and determined the damages that will be done by the building and operation of such railroad, to the real and personal property situated on the route fixed by the ordinance defining said franchise, and shall pay to the owner or owners of the real and personal property so affected, or into court for them, the amount of their respective damages.

The most important question at the hearing was whether this section, which applies to the construction and operation of "any elevated, underground, or other street railroad, on, over, or under any street or alley of any incorporated town or city," applies to Kansas City. The court decided that it did not and, secondly, that there was no legal damage done to Nugent for which he could ask an injunction. Much was said about the plaintiff's right of ingress and egress, but the court held that the fact of cars passing along the track so near the curb, while it might interfere with ingress and egress to Nugent's property, this, nevertheless, would constitute no legal damage. On this point the case of Rafferty vs. the Central Traction Company, 23 Atlantic Rep. 884, was relied upon. The same question had been frequently passed upon by the Kansas City circuit court in regard to the right of a plaintiff to stand a wagon and team in front of his premises, and has been uniformly decided against that right.

NEW PUBLICATIONS.

Poor's Manual of Railroads for 1895 appears this year even better than ever. The current issue contains more information than any previous one, and has been compiled with the care which has won its unquestioned reputation as the most reliable work of the kind published. It contains, as formerly, statements showing for a series of years the mileage, history, operations, financial condition, etc., of the leading street railways of the United States, in addition to its mine of information about steam roads and the cities and industries which support them.

The Second Avenue Traction Company, of Pittsburg, has issued a very neat and complete pamphlet on Calhoun Park and the other attractions along its route. It is very interesting reading and cannot fail to draw travel.

Among things which will interest street railway engineers in the Year Book of the Society of Engineers of the University of Minnesota, is a portrait and biography of Prof. Geo. D. Shepardson, and an article on the use of electric railway feeders by E. P. Burch, electrical engineer of the Twin City Rapid Transit Company.



Many of the claims for damages against street railway companies have their amusing features. Robert E. Vader has sued the Minneapolis Street Railway for \$5,313.60 damages, and his wife has sued for \$10,000. The company uses safety gates on its cars to prevent people from getting on and off while cars are moving. These gates were put on to prevent damage suits, but failed in this instance. Mr. and Mrs. Vader say the opening of a gate frightened their horse causing him to run away. Both litigants were thrown out of their buggy, and allege severe injuries.

* * *

Diantha C. Jordon commenced action for \$15,000 damages against the Detroit Citizens' Street Railway. She states that a car became disarranged and emitted and belched forth great volumes of smoke and flame and flashes of electricity from under, in and around it, filling the plaintiff with great fear, anxiety and alarm. She asked the conductor to give her a transfer and to stop, and let her off. He refused her request, so believing her chances of being injured and killed were greater if she remained in the car, she jumped. She claims that the company should have provided safe electrical apparatus, and if the case comes up, there will be some important testimony brought out on this point.

* * *

In cases of personal injury and death claims, there are two kinds of policy prevailing as to settlement. One favors the immediate settlement of all claims at once by the payment of a nominal sum, while the other favors the dragging out of claims in the courts. If it were not for the vultures of attorneys who make a business of hunting up personal injury cases, it would be far easier to settle them than it is. The announcement in the newspapers of a big verdict in a personal injury case, arouses the cupidity of others who have the impression that the litigant gets big money, while the facts are that the attorney gets the larger share.

The prejudice of juries in favor of persons who are injured is well known, and is relied upon by attorneys of this character to secure verdicts in litigated cases, and the large fee for comparatively little work spurs them on. Every case which is litigated and in which a large judgment is recovered, incites the commencement of similar cases. When a railway successfully defeats a claim outside of the lawyers and persons directly interested, nobody hears of it.

Where a person is injured and has a law suit, he seldom gets well until his case is tried or finally disposed of. The

longer he lies idle and pretends to be injured, the greater his damages appear to be in case of litigation. On this account each week and month of delay in the settlement is constantly adding to the amount of damage which the claimant may expect to recover in litigation. Lawyers who engage in this class of practice find it more profitable than the ordinary run of legal business. They leave no stone unturned to get evidence against the company. Very often evidence is manufactured, witnesses suborned, the parties injured prevailed upon by attorneys to change their testimony and statements in important facts, so as to make a case sufficient to submit to a jury and then the jury is relied upon for the balance.

Even in cases where there is no apparent legal liability, it is often wise to settle for a nominal sum. It is not possible nor desirable in all cases to make such settlements, and there are cases where it is so clear and apparent that there is no legal liability as to make a settlement undesirable. In many cases no claim is ever presented, nor is any call made for a settlement. Such cases should be allowed to slumber, and not be investigated.

When claims are settled quietly, the very fact of making a settlement for a small amount can be used by a claim agent to advantage in settling other claims of a similar nature. In fact it is often uncertain until a case is tried, whether a company is liable or not. Many cases which seem to be clearly in favor of the company, will, after a lapse of one or two years, when the company's witnesses are scattered and lost sight of, or when they have forgotten material facts, become dangerous cases, and involve an element of risk which can be avoided by a settlement.

* * *

A case against the Philadelphia Traction Company recently tried shows how juries sympathize with injured persons. Adam Clark Tietz got a verdict for \$27,000 in the Common Pleas Court for having the skin of his nose scratched. The three judges of the court refused to grant a new trial. An appeal was taken to the supreme court which reminded the trial judge that he should have instantly set aside the verdict when it was rendered, because it was in plain violation of the law, the evidence and the equities involved. The judges of the supreme court said: "The jar occasioned by the collision did not jostle any other passenger from his position, but the plaintiff, who was standing on the rear platform, was thrown forward against the glass window in front of him, and the skin was broken along the ridge of his nose by contact with the glass. No other injury was visible or was complained of at the time."



The Partridge Carbon Company, of Sandusky, O., reports that its sales this year are double those of last year.

Louis W. Hodges, Room 6, No. 67 Federal street, Boston, has been appointed assignee of the Reliable Manufacturing Company.

Smethurst & Allen, of Philadelphia, have the contract for the line construction of the Washington & Great Falls Electric Railway Company, Washington, D. C.

The Bates Machine Company, Joliet, Ill., is running its shops night and day with orders eight months ahead. The new catalog of the Bates-Corliss engine is interesting.

The Bass Foundry and Machine Company, Ft. Wayne, Ind., will furnish the Lake Street Elevated Railroad, Chicago, with 240 No. 2 Krupp steel tired 33-inch motor car wheels.

The Empire Electric Insulation Company, of Schenectady, N. Y., is now under the sole management of William M. Stewart, his partner, G. H. Rupley, having retired from the business.

J. H. Vail, New York, having been chosen as its consulting engineer, is now drawing plans for a complete electric and steam power plant for the State Mutual Life Assurance Company, Worcester, Mass.

The Griffin Wheel Company has enlarged its Chicago foundry by adding three floors, thus increasing the output by 800 car-wheels per day. The addition will have seven floors and 50 annealing pits when completed.

Strieby & Foote, Newark, N. J., are having such great success with their rail bond and special forgings that they are building large additions to their plant. The factory has been crowded with orders for several months.

The Gates Electrical Manufacturing Company, Chicago, has been incorporated with \$25,000 capital, by J. Holt Gates, William F. Camp, Jr., Adolph Lissen and D. V. Samuels. The company will manufacture motors.

The Garton-Daniels Electric Company, manufacturing the Garton lightning arrester at Keokuk, Ia., reports a large increase in trade. An order was recently received for Garton arresters, to be installed in a lighting station in the tropics.

Charles A. Schieren & Co., of New York, Boston, Philadelphia and Chicago, among recent foreign sales

report an order for three 26 inch double perforated electric belts, each 105 feet long, for an electrical plant at Rouen, France.

The line material of Albert & J. M. Anderson is becoming decidedly popular on the large Chicago systems. It is used exclusively by the North and West Chicago Street Railroads and recently the Chicago City Railway gave a large order.

Morris & MacCurdy, Indianapolis, Ind., manufacturers of the Phoenix rubber insulating paint, are rapidly increasing their business throughout the country. Elmer P. Morris, on his recent trip through the east, was very successful in introducing their paint.

The City Electric Railway of Port Huron, Mich., has laid a short piece of all metal track, using the Daniels steel tie, Illinois Steel Company 72 pound T rail and Paige Iron Works, Chicago, special work. The ties are laid on concrete and are 30 inches between centers.

Charles L. Gwinn and Joseph P. Hunter, trading as C. L. Gwinn & Co., mechanical engineers and dealers in electric railway supplies, 707-709 East Lafayette street, Baltimore, has assigned to Ferdinand C. Dugan. The assets are \$5,000 and liabilities are said to be \$9,000.

The Siemens & Halske Company, of America, which recently purchased the plant of the Grant Locomotive Works in this city, has completed its first steam locomotive, being part of an order of 20 for the Chicago, Burlington & Quincy. The machine is said to be very handsome and efficient, being a 10-wheeler.

"30 Years and 30,000 in Use," is the introduction to the new catalog of the various lines of hot water heaters, issued by William C. Baker, 143 Liberty street, New York. The 100 pages are illustrated with several hundred cuts showing the many types and parts of heaters. Those adapted to street cars are fully described.

Fisher & Porter will dissolve partnership September 30, Albert Fisher retaining their present office, 1025 Monadnock block, Chicago, and representing Wm. Todd & Co., Youngstown, O., builders of high grade and heavy duty engines; and H. J. F. Porter removing to 1433 Marquette building, where he will retain the agency of the Bethlehem Iron Company.

The Abendroth & Root Manufacturing Company, New York, has of late filled a number of notable orders for its improved Root water tube boiler, principally in New York City and vicinity. Arthur Loretz, Jr., formerly New York manager for the National Water Tube Boiler Company, is now representing the Root boiler at 28 Cliff street, New York City.

The Cradock cable made by George Cradock & Co., Wakefield, Eng., has broken another record on the North

Chicago Street Railroad. One of these ropes running on Wells street ran 8 months, 10 days. The longest lived American rope on the same line lasted only 6 months. If the Cradock people continue to raise the Wells street record as they did the tunnel loop record they will have it doubled before they get through.

The Falk Manufacturing Company is still engaged in its cast rail joint work in Chicago, running four machines and putting down about 500 joints per day. More work is also being done for the National Railway lines in St. Louis, and the contract has been closed for 15 miles of track for the Consolidated Traction Company at Newark, N. J., all of which goes to show the marvelously increasing popularity of the "joint that never needs repairs."

C. C. Peck, engineer and builder of steam plants, Rochester, N. Y., is building three 300-horse-power externally fired Peck boilers, for the Ohio Institution at Columbus, O., and one 250-horse-power internally fired Peck boiler for the Bausch & Lomb Optical Company of Rochester, N. Y., and has been awarded the contract for four 300-horse-power externally fired Peck boilers for the city of Buffalo, N. Y. These boilers are to carry 165 pounds steam pressure.

The Electric Railway Equipment Company, Cincinnati, O., has received so many orders for motor bearings that it is 2,000 sets behind. Having special machines for making these bearings, the company is usually able to fill orders promptly. The Benson rail bond, made by the company, is also in great demand. A vast quantity of tubular poles is turned out, and in great variety. In flexible brackets the company has prepared new designs, both plain and ornamental.

Heine boilers, aggregating about 1,000-horse-power, have been contracted for by the J. G. Brill Company, of Philadelphia, for a street railway in Cape Town, South Africa. The fact is very creditable to American manufacture, as the German and English competition of greatly inferior boilers at largely lower prices was very strong. The sale was effected by H. L. Van Zile, manager of the New York office of the Heine Safety Boiler Company, of St. Louis, who has been very successful in pushing that admirable boiler among large eastern steam users.

The Peckham Motor Truck & Wheel Company, New York, has made a contract to supply the Third Avenue Railroad, New York, with 183 Excelsior trucks fitted with New York Car Wheel Company wheels, and 8 extra long trucks to go under postal cars. The company has closed a fourth order for 50 extra long trucks for the Broadway cable line, making 200 for that line; a third large order for the Baltimore Passenger Railway Company; large orders for the Halifax Street Railway Company, Halifax, N. S.; Dublin, Ireland, Bristol and Coventry, England, San Diego, Cal.

The Lane & Bodley Company, Cincinnati, is now mailing a very interesting catalog illustrating the various types of its Columbian Corliss engines which are especially adapted to railway and electric work. Complete explanation of the arrangement and operation of all the parts, with instructions as to foundation construction, erection and the economical generation of steam, combine to impart a great deal of really valuable information. A partial list of 400 firms, of users of these engines, is also given and concludes the pamphlet which from first to last page ably sets forth the many valuable features of the Columbian Corliss.

The Hunt Air Brake Company, Pittsburg, has issued in pocket form, with heavy envelope covers, an instruction book giving full details as to the operation of its air brake. Diagrams are also included showing plan, elevation and cross section of a street car thus equipped. An ingenious working plan showing the operation of their 3-way valve illustrates its operation as it would be impossible to describe in words. These brakes have been on the Citizen's Traction, Pittsburg, four years. Recently an emergency stop was made in less than 8 feet while running at 12 miles per hour. An air whistle is a feature of the Hunt equipment.

Charles A. Schieren & Co., the leather belt manufacturers of New York, Boston, Philadelphia and Chicago, have just shipped a large exhibit of their products to the Cotton States and International Exposition to be opened this month at Atlanta, Ga. The exhibit will consist of large main driving belts of their electric and perforated electric brands, also dynamo belts, and belts for saw mills and cotton mill work. The largest belt running at the exposition will be a main drive 36 inches wide, and will be a Schieren perforated electric. This concern will also have ten or a dozen of their perforated electric belts in actual use running on dynamos.

Harold P. Brown, Morris building, New York, is in receipt of the following extremely complimentary letter, which explains itself, written by George E. Talcott, chief engineer of the Newark Consolidated Traction Company:

"In answer to your request as to how much of a saving you made for us at Boyd street, the writer is pleased to state that a little more than double what I first told you, or 300 horse-power. Not this alone, but generators do not labor so hard or heat so badly with your apparatus. In connection with the system, the electrolysis action that has been so annoying in our station is entirely removed, as far as I can find, and it is the belief of the writer that were owners of plants like this one to know of the benefit of your system, as well as the obviation of electrolysis, not one would be without it. If your system was known in all cities where trolley roads are in operation they would not be without it."

The Edward P. Allis Company, of Milwaukee, Wis., has recently sold one 2,000-horse-power and two 1,000-horse-power engines for West End Street Railway, Boston, Mass.; two 500-horse-power, Staten Island Electric Railway, Staten Island, N. Y.; two 1,000-horse-power, Cicero & Proviso Street Railway, Chicago; one

2,000-horse-power, Consolidated Traction Company, Newark, N. J.; two 1,000-horse-power Detroit Citizens Street Railway, Detroit, Mich.; one 1,000-horse-power, Louisville Railway, Louisville, Ky.; one 2,000-horse-power, Louisiana Electric Light Company, New Orleans; one 1,000 horse-power, Albany Electric Illuminating Company, Albany, N. Y., and one 1,000-horse-power, Albany Electric Railway, Albany, N. Y.

The Ball & Wood Company, New York, reports that never in the history of its business, has it had so many orders on its books as at present. This condition of affairs has compelled it to make not only a large addition to its works in building a new boiler house and rearranging its steam plant, but also in the purchase of more large tools. Recent orders include engines for Milwaukee, Wis., Terre Haute, Ind., McGregor, Ia.; Helena, Mont.; Denver, Colo.; Colorado Springs, Colo.; New Orleans, La.; Altoona, Pa.; Wilkes-Barre, Pa., and Flatbush, N. Y.; besides a large number for the new buildings now going up in New York City. Both from its Chicago and New York offices this company reports some stiffening in prices, and altogether it is confident that the improvement of business will continue.

The Borden & Selleck Company, 48-50 Lake street, Chicago, have recently closed the following contracts for Harrison conveying and elevator machinery: The coal storage plant and for conveying coal from cars to the two batteries of boilers for the Toronto Street Railroad Company, Toronto, Ont., the contract including a large crusher for crushing bituminous coal; coal handling plant for J. F. Clancy & Co., Racine, Wis.; coal conveyors and elevators for C. P. Wilder & Co., South Chicago, Ill.; coal conveyors and elevators for E. L. Hedstrom & Co., at their new Thirty-first street yard, Chicago, and coal conveyors for handling coal to boilers, including storage tanks; also power crusher for the Chicago Electric Transit Company, North Chicago power house. They report business is improving and their factory is running to its full capacity.

The J. C. McNeil Company, steam boiler maker of Akron, O., has recently sold Cook boilers to the Pittsburgh Iron & Steel Company, Pittsburgh, Pa., 7,400-horse-power; the Grammercy Company, New Orleans, La., 3,000-horse-power; the S. George Company, Wellsburg, W. Va., 500-horse-power; Ohio Iron Company, Zanesville, O., 1,000-horse-power; and Corrigan, McKinney, Cleveland, O., 1,000-horse-power. The results obtained by the company far exceed its expectations and the boilers are giving entire satisfaction. The agents of the McNeil Company are G. H. Morrison, 144 High street, Boston, Mass.; Geo. H. Connor, Mutual Life Building, Philadelphia; Oliver C. Boyd, Lebanon, Pa.; W. M. Kerr & Co., 518 Ferguson Building, Pittsburgh; Edward L. Stream, Room 6, Cotton Exchange, New Orleans, and Carrie Engineering Works, Monadnock Building, Chicago.

Some roads which have been purchasing of the Mark Railway Equipment Company, Chicago, are being put to no small annoyance. It seems the Mark Company had considerable of its work done by the Erie Malleable Iron Company, of Erie, Pa., and in settlement for same assigned accounts which the Mark Company had against several roads. Among them are the Battle Creek and Syracuse street railways. In order to make sure of these accounts the Malleable Iron Company attaches the accounts to prevent possible payment to the Mark Company. While this is a very convenient way for the Malleable people to insure collection, and possibly may be their only alternative, it at the same time places the roads so enjoined in a very unpleasant and annoying position, as a careless public are apt to get the impression that the road is trying to evade paying its bills, when in fact it is none of the road's funeral at all.

The Fuel Economizer Company, of Matteawan, N. Y., finds business is improving and it is now very busy, having recently obtained, among others, the following large orders: Anaconda Mining Company, Anaconda, Mont., 2,400-horse-power; Edison Electric Illuminating Company, Paterson, N. J., 2,000-horse-power; Albany Electric Illuminating Company, Albany, N. Y., 600-horse-power; Toledo Traction Company, Toledo, O., 2,000-horse-power; West End Street Railway Company, Boston, Mass., 2,000-horse-power; McCahan Sugar Refining Company, Philadelphia, Pa., 1,500-horse-power, (second order); Lewiston Bleachery, Lewiston, Me., 1,200-horse-power (second order); The LaCrosse Water Works, LaCrosse, Wis.; the Nonotuck Silk Company, Florence, Mass., 200-horse-power, (second order); and Dominion Cotton Mills Company, Montreal, Can., 1,000-horse-power (tenth order).

The Ohio Brass Company, of Mansfield, O., has placed on the market a complete line of devices for supporting the trolley wire, that are designed to avoid the great annoyance of sparking by offering to the trolley wheel a perfectly smooth and uninterrupted running surface the entire length of the line. These articles, which are listed in the catalog No. 3, recently issued to the trade, are designated as, the "Walker trolley ear," "Walker splicing ear," "Detroit section insulator," "straight under-running adjustable cross-over," "straight under-running adjustable switch," and "Chapman insulated adjustable cross-over." These devices have been in use long enough to demonstrate the fact that they are all that is claimed for them, and the marked favor with which they have been received shows their practicability and usefulness. The several agencies that were recently established are producing very flattering results. This is largely due to the ability of the local managers as well as to the excellence of the material put out by the Ohio Brass Company.

The Westinghouse Machine Company, Pittsburgh, Pa., reports business active and the outlook very flattering.

Orders for compound engines the past month include one 250-horse-power to Whittenton Manufacturing Company, Taunton, Mass.; one 100-horse-power and one 125-horse-power to American Hydraulic Dredging Company, East Douglas, Mass.; one 80-horse-power and one 100-horse-power to Sioux Consolidated Mining Company, Mammoth, Utah; one 200-horse-power to Weddell & Smith, Overbrook, Pa.; two 80-horse-power to Upper Peninsula Hospital for the Insane, Newberry, Mich.; four 250-horse-power to United States Capitol Building, Washington, D. C.; one 250-horse-power to Connellsville Electric Light Company, Connellsville, Pa.; one 250-horse-power to Belvidere Electric Company, Belvidere, Ill.; three 160-horse-power to Carnegie Library Building, Pittsburg, Pa.; one 125-horse-power to Hackensack Gas & Electric Company, Hackensack, N. J.; one 300-horse-power to Wilkinsburg Electric Company, Wilkinsburg, Pa.; one 250-horse-power to Sing Sing Electric Company, Sing Sing, N. Y.; one 200-horse-power to Gloversville Electric Company, Gloversville, N. Y. In addition to the above, the increased number of orders for standard and Junior automatic engines, indicates a general revival in all branches of manufacturing.

WILL IT COME TO THIS?

A New York World reporter says he was told that the Belt Line cars will be among the most luxurious public street cars ever built. The equipment will be made with a view to furnishing travelers with the crisp salt air of the ocean along the water-way and the always interesting views of the ships and docks. One of the company's directors, in discussing the future liberal policy of the company, said: "Before the lines are completed the company will have a number of private cars furnished with all luxuries and intended for theatre parties and excursions. These cars will be furnished with pianos, cooking ranges and refrigerators fitted out with costly furniture and in every way as finely appointed as many yachts. There will be raised seats on the roofs like the Broadway stages, and all facilities for observation. Electric fans will be provided, and colored electric lights. I think the time will come when business men in the far end of the city will have club cars, as they do in the New Jersey suburban towns, provided with whist tables, easy chairs, and perhaps sideboards. It may be said that public travel would be interfered with, but with the multitudinous lines of the company and a better speed, travel would not be interfered with."

Surely if this keeps up, the comforts of trolley riding will be so great, that people will live in them in preference to houses, hotels and swell apartments.

The Cairo, Egypt, Tramways Company, recently organized with \$800,000 capital, has purchased of M. Empain and the General Economic Railways Company, a street railway franchise, which was granted in December, 1894, and 4 sections of line fully equipped for electric traction.



Joseph T. McNary has resigned as general manager of the Logansport, Ind., Railway.

William L. Elkins has been nominated for congress in the second district of Philadelphia.

Ben Willard, general manager of the New Orleans Traction Company, called at the REVIEW office.

Lawrence McGann, president of the Chicago General Railway Company, is on a business trip to Idaho.

The son of George B. Kerper, who now owns the lines at San Diego, Cal., enters Harvard College this fall.

Charles Cleminshaw, president of the City Railway Company, Troy, N. Y., has returned with Mrs. Cleminshaw from their trip abroad.

B. B. Taggart, Jr., has been made assistant superintendent of the Watertown & Brownsville Street Railway Company, Watertown, N. Y.

F. A. Hover, general manager of the Newcastle Car Manufacturing Company, of Newcastle, Pa., recently made the REVIEW a pleasant visit.

A. Langstaff Johnston, Philadelphia, consulting engineer, has been appointed to act in that capacity for the new Traction Company, of Richmond, Va.

Heller & Wellman have been engaged as electrical engineers by the constructors of the Buffalo, Gardenville & Ebenezer Electric Railway, Buffalo, N. Y.

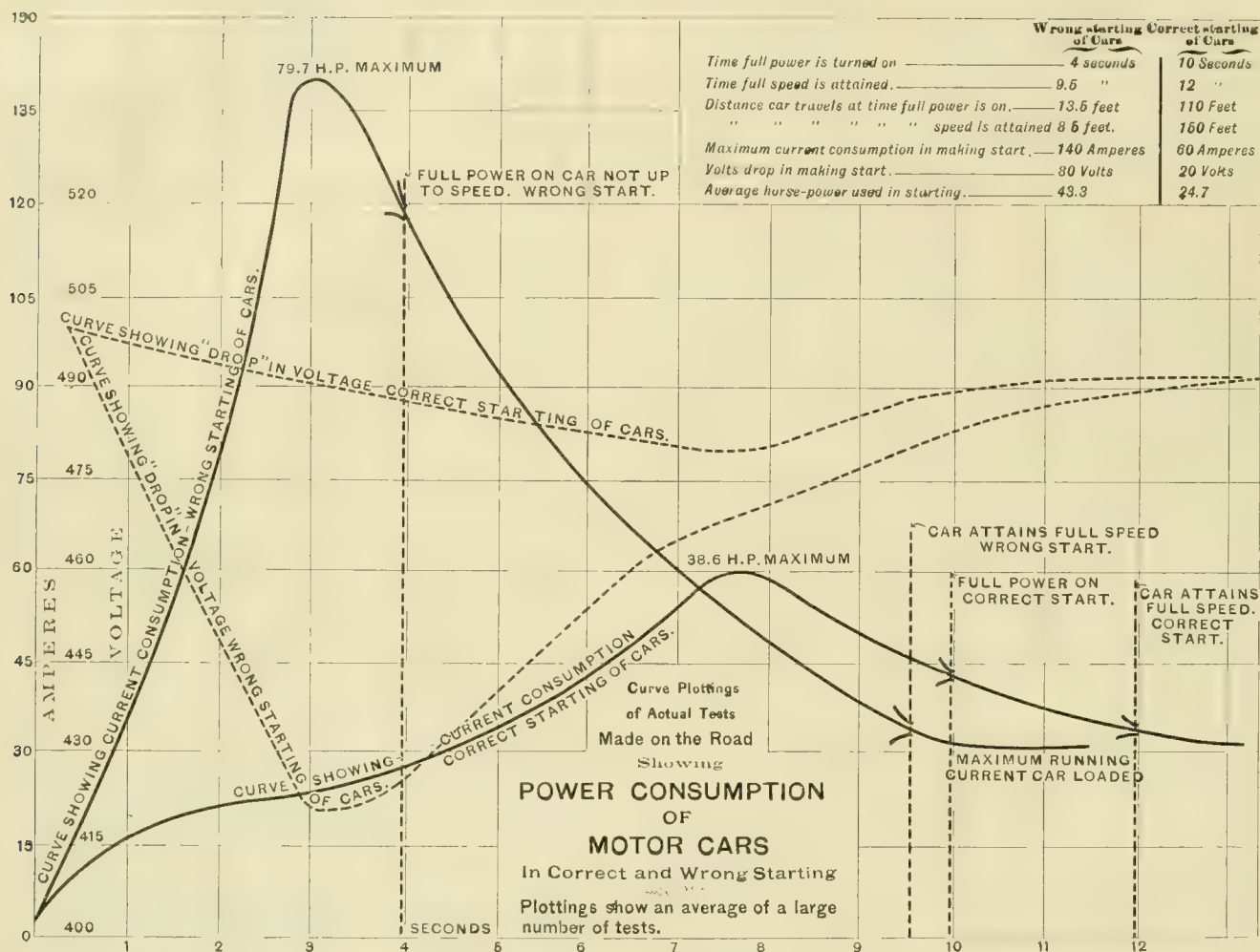
Frank A. Reed, vice-president of the Washington, Alexandria & Mt. Vernon Electric Railway, died by his own hand, August 23, in his home at Alexandria, Va.

Superintendent Fred W. Sweet, of the Wichita, Kan., Electric Railway and Light Company, has been promoted to the position of manager, made vacant by the resignation of J. W. O'Neil.

Daniel W. Holden, superintendent and assistant treasurer of the Washington, Alexandria & Mt. Vernon Railway Company, died of appendicitis August 15, the very day his resignation was to have taken effect.

Herbert Bronson White, secretary of the Calumet Electric Railway Company, Chicago, was married September 5 to Miss Grace Hollister. After November 1 Mr. and Mrs. White will make their home in Chicago.

Frank M. Leland, of Oakland, Cal., under whose supervision the Oakland, San Leandro & Haywards



FOR MOTORMEN.

The above diagram is reproduced from the *Street Railway Review* for August, 1895, and shows the average results of a number of tests made on the Chicago City Railway to determine the amount of power required in starting a car with various methods of handling the series-parallel controller. The upper heavy line shows the consumption of current when power is turned on too fast at the controller. The lower heavy line is the current consumption when the controller is properly handled and the car brought up to speed, on a level, in about 12 or more seconds. The gain in time by the too quick start is only $2\frac{1}{2}$ seconds—almost too small to be appreciable, and yet the maximum horse-power required is over twice as much and the total horse-power required in starting is 24.7 in one case and 43.3 in the other. Not only does this power cost the company money for fuel at the power house, but it strains the motors and runs up repair bills. Can a company afford to keep motormen who will insist on crowding their cars up to speed and producing results like those shown in the upper line? Let us study the diagram a little and find out what is the secret of making a correct start with a series-parallel controller. The greatest consumption of current comes at the time the motors are first thrown in multiple. This occurs after the handle has been moved beyond the third notch on the Westinghouse and Walker controllers; after passing the fifth notch on the General Electric, type K2, and after the fourth notch on the type K. Special attention, therefore, is called to the importance of *not throwing the motors in multiple until after they have attained the highest speed at which they will run when connected in series*. In other words, do not make the long throw between the higher and lower group of notches until you are satisfied that the car will not run any faster on the lower notches. In the diagram it is apparent that in making the bad start the motors were thrown in multiple 3 seconds after the car started, and the highest notch was reached in 4 seconds. In the correct start they were thrown in multiple after $7\frac{1}{2}$ seconds and were put on the highest notch at 10 seconds. The pause at each notch is over twice as long in the correct start, yet the man making the incorrect start has gained only $2\frac{1}{2}$ seconds and used up fully twice as much money to do it. The tests were made on a level, and when going up grade the time of starting must be lengthened. If motormen will observe the lessons taught by the above, it will add greatly to their value as employees of a company and increase the efficiency of the service. This has been practically demonstrated on the road on which the tests were made.

TO THE SUPERINTENDENT.

We think you will at once appreciate the value of having the above in the hands of all your motormen, as it sets forth in a clearer and more forcible way than has yet been done, the difference between correct and incorrect handling of the series-parallel controller. We have prepared the sheet for the express benefit of managers, who may want them in educating both old and new motormen, and there has been a great demand for it. These will be sent postpaid for \$2.00 per hundred sheets. Fifty copies, \$1.00.

STREET RAILWAY REVIEW,

OLD COLONY BUILDING, CHICAGO.



MONTREAL THE CONVENTION CITY

To one who has spent his life in the United States the city of Montreal is full of interest. There are many old buildings, and churches which present a good background for those of a more modern style of architecture. There are the historical features which are conspicuous everywhere, so that one who tries to obtain a knowledge of them all becomes bewildered after the first hour. Cleanliness is also one of the noticeable things, particularly the clean streets, and the absence of dust, soot and smoke, which make so many American cities disagreeable.

It does not take the visitor long to discover that there are really two cities of Montreal, the French and the English. In 1672 the population of the city was 1,520. Today there are about 300,000 inhabitants, two-thirds of whom are French, the remainder English. Although outvoted, the latter have two-thirds of the wealth. The east side is the French quarter, which is by far the strangest and most interesting portion of the city, for the houses are old fashioned, small and quaint, the streets narrow, and have French names, the costumes of the people queer to American eyes, and presenting a great contrast to the more modern architecture of the west side, where the English live. Here the streets are wide, and designated by good old English names. In the best residence sections there are well kept lawns. The rich green of the grass rests the eyes and serves to make brighter the brilliant colors of the flowers that are blossoming in the gardens. In the poorer sections the dwellings, all of stone, come up to the street line.

That the English are gradually gaining the ascendancy is shown by the town of West Mount, which for 100 years and more had been known as Cote St. Antoine. English gentlemen made their homes within its boundaries, and a few years ago adopted the more modern name. The French call themselves Canadians refusing to recognize any rights the English may have to that name, persisting in calling them English. The English adopt the same policy by calling themselves Canadians, and the others French. There are thousands of French, who cannot speak a word of English, as there are thousands of English who cannot speak a word of French, neither do they desire to learn. On Tuesday or Friday a visit to Bonsecours market, which is reached by the

Windsor street cars, going to the right from the convention hall, or Queen's hotel, will give the visitor a glimpse of life that will be as good almost as a trip to Europe, for here are gathered representatives of nearly all nations in their native costumes.

Located every few blocks are little parks, or breathing spaces maintained by the city. In each of them a successful attempt has been made to give the people an attractive place. There are winding walks, well-kept grass plots, handsomely designed beds, which are supplied with flowering plants. There are plenty of benches to accommodate those who desire to rest. These squares are a rendezvous for the carters. In the United States they are called cab men and hack drivers, but in Montreal they are known summer and winter as carters. Gradually the carters are becoming fewer in number, being driven out of business by the superior transportation facilities afforded by the Montreal Street Railway Company so that now their livelihood depends upon the strangers, who desire to ride over the mountains and cemeteries, or hire the carter for a guide to the interesting places that abound in such great numbers.

EARLY MONTREAL.

The city of Montreal is situated on an island, which is about 30 miles long and 10 miles wide. The city itself is $6\frac{1}{4}$ miles long by 4 miles wide, nestling at the foot of the eastern slope of Mount Royal, or Mont Real, from which the city takes its name. It was in the fall of 1535 that Jaques Cartier, the discoverer of Canada, sailed up the St. Lawrence river in search of an Indian settlement called Hochelaga, of which he had heard while at Quebec. This event was just 360 years before the members of the American Street Railway Association railed from the south in search of the large city Montreal, of which they had heard two years before at Milwaukee and a year before at Atlanta.

History tells us that Cartier had a galeon of 40 tons and two open boats. On October 2 the exploring party, consisting of 50 sailors with their officers cast anchor below La Chine rapids, at dusk. In the distance through the trees they could see the flames of many fires, which they concluded to have been built by Indians. In the

morning the little company landed. Through the forests they went until they came upon a clearing at the eastern side of the mountain, which to-day is known as Sherbrooke street, the most fashionable residence district of the city. Here were the wigwams of Hochelaga, protected by a triple row of palisades made of poles. Cartier gave the Indian chief, who came out to meet him two hatchets, two knives, and a crucifix. The natives brought their sick to him for healing. When he had read a portion of the gospel of John and prayed for their bodies and souls, he started to ascend the mountain accompanied by the Indians. Reaching the summit, he became so much impressed with the beauty and grandeur of the scene, that he gave it the name Mont Real, which has been shortened into Montreal.

Jacques Cartier left the Indians in peaceable possession of Hochelaga when he sailed away from the New World to his home in France. Seventy years later Champlain came to Mont Real, which is known today as Mount Royal. He saw no Indian village at its foot, but two aged Indians told him how one white man had come to that place years before in a big canoe with sails, when their beloved Hochelaga was the largest Indian village in that vicinity. He had gone away and there had been no other white man until he had come. A war had broken out among the Indians, which ended in the burning of the village and massacre of its inhabitants, except the two old men, who were speaking to the explorer. In 1611 Samuel de Champlain cleared the ground and built a wall of bricks on the site of the present custom house, to

measure "ice shove" in the spring. This was the trading post, Place Royal, but Champlain did not carry out his intention to found a settlement. In 1613 he appeared at St. Helen's Island, opposite the trading post, whence he departed on his trip of exploration up the Ottawa river, and did not return to Place Royal.

FORMAL SETTLEMENT.

Montreal was formally founded October 14, 1641, by Paul Chomedy, sieur de Maisonneuve, who called the settlement Ville-Marie, the solemn consecration taking place on the 17th of May following, near the site of the custom house. Maisonneuve was a brave man who brought with him a goodly company. There was the venerable Marguerite Bourgeoys, of Troyes, France, who founded the first educational establishment for young women in Canada—the congregation of Notre Dame. Mlle. Jeanne Mance came, bringing an equivalent of \$250,000, to be used in benevolent work, the bequest of Madame de Bouillon, widow of a former superintendent of finance of France. This donation was used in the building of a stone edifice outside



the pickets, known as Hotel-Dieu Hospital. This building was used for the purpose of a hospital until 30 years ago, when the greed of commerce made it necessary to transfer it to the northern part of the city. There was Glosse, a noted trapper and hunter, and Lemoyne, the first farmer, and Father Vimont, the first priest, among the company of 50 persons who were the first settlers of Ville-Marie. The little settlement had a peaceful career until 1643, when an Algonquin Indian pursued by Iroquois took refuge within its walls. In a few months

the Iroquois attacked a party of six unarmed men who were sawing wood a short distance outside the settlement. Three of them were killed, and three were carried into captivity. For 50 years there was a succession of Indian attack. Tradition says de Maisonneuve had a hand-to-hand encounter with several Indians on the site of Place d'Armes, opposite Notre Dame parish church, which resulted in the death of the Indians. A bronze statue of Maisonneuve was unveiled on the spot this spring.

SURRENDERED TO THE ENGLISH.

The French kept control of Montreal until September

October Montgomery surrounded the city, which, being short of provisions, was surrendered to the Americans and the stars and stripes waved over Place d'Armes for several months.

Again in 1812, did the Americans come to Montreal, but not of their own accord, for they were prisoners of war. These were United States troops under command of General Hull and 25 officers. At this time the walls and gates of the city were standing. To-day they are represented by stone tablets set in buildings, under the auspices of the Antiquarian Society, which has undertaken to mark all places of historic interest.



VIEW FROM NOTRE DAME.

8, 1760, when it was surrendered to Generals Murray and Amherst. The articles were signed which gave Great Britain possession of Canada, and drove the French from their power in the new world, which was never to be regained. Most historians locate the signing of the articles in Chateau de Ramezy, on Notre Dame street, opposite the city hall.

The American revolutionists captured Montreal in 1775. Ethan Allen came over from Vermont with 200 men, but General Carleton, who learned of his approach, got together 250 Canadians and English and 30 men of the 29th regiment. Allen and his force took possession of houses outside of the city, were surrounded, and surrendered after a loss of 5 killed and 10 wounded. The others were sent to England as prisoners of war. In

On a building at the corner of McGill and Notre Dame streets is a tablet which reads:

RECOLLETS GATE

By this Gate
Amherst took possession
8th September, 1760.

General Hull, U. S. Army
25 officers, 350 men entered
Prisoners of War
10th September, 1812.

This is the last record of an invasion from the United States.



When the Americans gave up the city to British rule, it began to grow. Until 1867 Montreal remained the capital of Canada but relinquished her title to Ottawa, retaining for herself the title of commercial metropolis of the Dominion. Her prominence is due to her natural position at the head of ocean navigation on the St. Lawrence, and the two great railway systems which bring to her the agricultural and manufactured products from the interior. These are exported or sent into other places at home, which require them. The records of the custom house show the exports for the year 1894 to have been \$40,911,819, of this amount the goods of

channel being of a uniform width of 300 feet at its narrowest points. The distance from Montreal to the Atlantic Ocean is 986 miles, which is 315 miles nearer to Liverpool than New York. A solid revetment wall runs along the whole river front of the city, beginning at the Lachine Canal and ending at the current St. Mary, a distance of $1\frac{1}{2}$ miles. The wall forms the outer edge of the river street. The wharves having a total length of 5 miles, are 10 feet lower than the grade of the street, which insures a good view of the harbor with its shipping, as there are no warehouses. Here lie vessels from nearly all ports of the world; from England with iron, dry goods, general merchandise; from France and the Mediterranean with wines and fruits; from Germany with glass and general merchandise. In return these vessels take cargoes of grain, cattle, lumber, mineral phosphates, and other productions of the Dominion. At night electric lights permit loading and unloading of



MONTREAL HARBOR.

Canadian manufacture were valued at \$32,622,246, and of foreign manufacture, which consisted chiefly of grain from the United States \$8,289,573. The imports were \$41,072,606, of this amount \$18,980,841 was the value of goods purchased in the United States. From these figures it will be seen that Montreal is an important outlet for the United States, requiring last year goods valued at \$27,270,414. The exports and imports during 1894 each show a decrease of about \$10,000,000 when compared with the figures of the preceding year. Seventy-five per cent of Canada's imports pass through Montreal and 35 to 40 per cent are entered at the Montreal custom house.

From Quebec to Montreal the St. Lawrence has a channel of a uniform depth of 30 feet. The work of deepening the channel was begun in 1851, which has required the removal of 8,500,000 cubic yards, the

cargoes to proceed with almost as much facility as in the day time. There are 15 lines of ocean steamers, which leave from this port weekly or fort-nightly for Liverpool, Glasgow, Hamburg, Antwerp, Havre, while tramp steamers also abound, together with a great many river lines.

BRIDGES.

Two types of bridge across the St. Lawrence attract attention, because of their length, the apparent difficulties that had to be overcome in their construction, and the difference in design. The first bridge was built by the Grand Trunk Railway in 1860. It was opened for public use in 1861, on the occasion of the Prince of Wales' only visit to his possession, for Canada is his special property. In honor of the queen, it was called Victoria bridge. It is of the tubular type, two miles in length, supported on 24 piers, the central span being 330 feet

long, the others 242 feet. It is 60 feet above the ordinary river level, and the tube is 22 feet high by 16 wide. The cost was \$6,300,000.

The Canadian Pacific bridge at Lachine, seven miles above the city, was completed in 1887. It shows the



CANADIAN PACIFIC BRIDGE.

advance that had been made in bridge engineering in twenty-seven years. It is of the suspension type, and offers much less resistance to the wind than Victoria bridge. There are two abutments and 15 piers, four land spans 80 feet long. The deep portion of the river is crossed by two flanking spans of 270 feet, and two cantilever spans, each 408 feet long. These latter spans have an elevation 60 feet above summer water level, and form one continuous truss 1,356 feet long. The cost was over \$1,000,000.



There are so many quaint and interesting objects to absorb and engage one's attention that he is likely to lose sight of the fact that in addition to its great importance as the chief port and forwarding station of Canada, Montreal is also the largest manufacturing center in the Dominion. There are foundries, sugar refineries, tanneries, silk mills, hardware manufacturers, carriages, sleighs, corn brooms, woodenware, glass, paints, drugs, edge tools, locomotives, steam engines, boilers, rubber goods, printing presses, agricultural implements, musical instruments, paper rope, seven sewing machine factories, type foundries, pins, tobacco, woolen and cotton goods, boots and shoes, sawmills, flour mills, rolling mills, lead works, brass foundries, clothing factories, nail and edge tool works, carpet factories, and rope factories.

There are 16 banking institutions, 26 fire insurance companies, 16 life insurance societies, and a stock exchange where Canadian securities are marketed. Of the banks the most widely known is the bank of Montreal established in 1817 by an act of parliament, with a paid up capital of \$350,000. In 1819 it was increased to \$650,000 and the following year to 750,000; in 1829, \$850,000; in 1841, \$2,000,000; in 1845, \$3,000,000; in 1855, \$4,000,000; in 1860, \$6,000,000 and in 1873,

\$12,000,000. The first full year (1819) of the bank's operation an 8 per cent dividend was paid, and since then with the exception of the years 1827 and 1828, when it paid nothing to shareholders, the annual dividends have ranged from 6 to 16 per cent., or a dividend of 12 per cent with a bonus of 4 per cent. Of late a dividend of 10 per cent per annum has been paid. After 8 per cent had been paid in 1819, there remained a balance of \$4,160 which was laid aside as a "rest" or reserve fund, and has amounted to \$6,000,000. The last statement



NEW YORK LIFE BUILDING.

shows \$12,000,000 paid up capital, \$6,000,000 reserve funds, \$815,152.10, undivided profit. The bank has notes in circulation to the value of \$4,912,415.

LOCAL GOVERNMENT.

The city is governed by a mayor and city council elected for a term of two years. There are 13 wards, each of which has two aldermen, who are elected at the same time, so that the city is not torn up every year by a municipal election. Last year there was expended on roads \$339,431.66; sidewalks, \$81,374.11; removing snow, \$40,515; sewerage, \$189,202; street cleaning and watering, \$77,448; harbor improvements, \$49,897.01; other expenditures in the road department brought the total to \$1,349,865.28.

There are 23.89 lineal miles of permanently paved streets in the city, about 15 miles being asphalt, 7 miles block stone and about 2 miles of wood block. This year a new block has been used on the streets, imported from England under the name of scoria block. It is made from the refuse of iron foundries, which gives it properties that are said to have greater wearing qualities than other pavement. They cost delivered to the work about 4 cents each. So far they have been giving satisfaction on streets where there is heavy traffic. The residence streets and many of the business streets are paved with

asphalt, the block stone pavement is near the harbor where there is a great deal of heavy teaming.

St. Catherine street is the retail shopping district, which has been pushed westward by the onward march of the wholesale trade, which has sought more room. St. James, Notre Dame, McGill, Craig and St. Peter streets are the leading down town streets, and financial centers, which remind one of the streets of New York below Canal street, as they are narrow and shoot off unexpectedly without any apparent reason. The finest residences will be found on Sherbrooke, Dorchester

and in the distance the Green Mountains of Vermont and the Adirondacks. For those who do not care to drive, there are many paths which can be easily climbed, a stairway with 427 steps, and an incline railway. On the slope of the mountain are the two large cemeteries, where rest the ashes of the dead—Mt. Royal cemetery, where the beloved of the English are buried, and Notre Dame de Neiges cemetery, which is used by all Roman Catholics. Both these cemeteries are well worth a visit. Logan park, in the northern portion of the city, containing about one and a half square miles, is a new park,



JAMES LINTON'S RESIDENCE.
CITY HALL.



SENATOR DRUMMOND'S RESIDENCE.
CHATEAU DE RAMEZY, OLD GOVERNOR'S MANSION.

West, Drummond, Mountain, Redpath, Simpson, University, St. Denis, Union avenue and McGill College avenue.

PUBLIC PARKS.

In 1875 the city purchased Mt. Royal, about 550 feet high, which by the expenditure of more than half a million dollars has been converted into a park. Nature has made the scenery, but art has cut a carriage road, which winds around the mountain three times, ascending by easy grades to the top, where there is a view that is unexcelled on this continent. Below the mountain is the beautiful valley of the St. Lawrence with its many islands; on the other side the Lake of Two Mountains,

which is being gradually improved. Last year the city appropriated about \$10,000. St. Helen's Island, in the St. Lawrence, which is reached by ferry, is another favorite breathing place.

WHAT TO SEE.

If the delegate who would see Montreal will keep in mind the fact that most of the objects of interest are within a short distance of each other, and that they either center around Notre Dame parish church or Mt. Royal, and that Windsor street cars, from which he can transfer to any line in the city, run by the entrances to the Convention hall and Queen's hotel, he will have no

difficulty in finding his way about the city. Conductors are polite, well-informed, and take pains to give full directions when asked concerning locations.

The view of Montreal from Notre Dame parish church, which is shown on page 519, gives a good idea of the city. The building on the right is that of the Imperial Fire Insurance Company. Adjoining it is the Bank of Montreal, which is valued at \$600,000. The walls are decorated with paintings commemorating early historical events. Both of these buildings face Place d'Armes, where the statue to Maisonneuve is standing, and where the "Stars and Stripes" once waved. The building on the extreme left is the postoffice, which was built in 1876 at a cost of \$400,000. Nearby is a magnificent building, which is being built by the Canada Life Insurance Company. The work of building is slow on account of the severe weather and the long time it takes



Canadians have the reputation for being enthusiastic in all sorts of out door sports. Whether it is the bracing qualities of the atmosphere that urges them to seek enjoyment in the fields, or whether it is an inheritance that has been handed down from the times, when "bolde knightes and faire ladyes" used to find pleasure in tournaments, is not exactly known. The reader can take his choice as to the cause, if he doesn't lose sight of it in the contemplation of the sports themselves. Winter sports are of more interest to the people of the States, because they are so different from their winter pastimes, than the summer sports, which are similar in both countries.



SKATING CARNIVAL—VICTORIA RINK.

the frost to get out of the ground. A few blocks to the northward is the court house, and next to it the city hall, which cost \$120,000. Opposite the city hall is the old governor's mansion, or Chateau de Ramezay, which was occupied by the French and English governors, and where the articles were signed whereby the French gave up their right to govern Canada. In the rear of the city hall and court house is Champs de Mars, the old parade ground. Near the convention hall is the Grey Nunnery, a large hospital and nunnery, which has 139 nuns, 37 novices, and 500 inmates.

Sohmer's Garden on the Notre Dame street line, in the French quarter of the city, is a pleasure resort that apparently does a good business. A variety show or concert is the attraction every night. There is a large pavilion open at all sides, except the stage, while outside is a menagerie, crystal maze, Armitage-Herschell riding gallery, and booths where miniature lotteries hold forth.

Sleighing is the most fashionable method of enjoying the bracing winter air. Every afternoon sleighs of all descriptions from the imposing four-in-hand turnout downward to the bob, including tandems, unicorns and single cutters, meet on the "Drive" at Dominion Square for a ride through the principal streets and up the mountain, where they find a merry company at the toboggan slide. This sport possesses more exhilaration than any of the others. The slide on the mountain is about 200 feet long leading to a meadow with a gentle slope that gives a coast of nearly half a mile.

Skating also attracts the people, who go to Back river on the Montreal Park & Island Railways, and to Victoria rink, which will be occupied by the supply men. Here a fancy dress carnival is held twice during the winter. There are other rinks, but they are not as swell as Victoria. Then there are curling and hockey matches and snow-shoeing. St. George's Club and the Athletic Club



ST. JAMES CATHEDRAL.

are the two leading snow-shoe clubs. The members start out for a walk through the country in the vicinity of the mountain, choosing a moonlight night. Shoes are put on at the head of Peel street. When all are ready the pace maker leads the way, followed by twenty to fifty men, in single file clad in picturesque costume. At the rear of the line is the "whipper in," who keeps the laggards up to pace. When the club house is reached, the evening is passed in social enjoyment until the time for the start home, when the national anthem is sung, and the party moves toward the city.

"People in the United States," said E. Lusher, secretary and treasurer of the Montreal Street Railway Company, "have an idea that it is always winter in Montreal. I suppose the reason is that most of the photographs sent from here are winter scenes. It is not always winter. We have summer every year, just as you do in the States, when the heat becomes quite hard to bear."

The summer amusements are as many and diverse as the winter pastimes. Lake St. Louis above Lachine, a widening of the St. Lawrence, is large enough for yachting. Regattas are sailed at frequent intervals. One of the most exciting races is that of war canoes, which hold twelve men. There are rowing clubs, too, which have quite a reputation for speed. St. Helen's Island opposite the city is the bathing resort, where several swimming clubs have their houses. On the land is played Lacrosse, the Canadian national game, which was borrowed from the Indians, cricket, lawn tennis, golf, foot ball, and base

ball. With all these diversions the inhabitants of the city have plenty of variety to enable them to occupy their spare time with a great deal of pleasure. Recently they have taken to trolley parties, an importation from the United States.

CHURCHES

To a casual visitor the most conspicuous feature of Montreal is its religious institutions, which consist of churches, nunneries, hospitals and parochial schools. Mark Twain said, in remarking of these buildings, "I never was in a city before where one could not throw a brick without breaking a church window." The number of streets named in honor of saints is also a surprise. There are 129 of them, beginning with St. Adolphus and ending with St. Zoe street, every letter of the alphabet being represented, except w, x and y. Thus is the religious nature of the stranger aroused, so that he is enabled to appreciate the wealth of beauty which these magnificent edifices possess, while at the same time he cannot help but praise the people for this outward demonstration of their duty to their creator. The visitor is welcome to enter any of the churches where at all hours he will find worshippers at the altars.

There are 63 churches, 20 convents and asylums, 6 hospitals, 25 schools and colleges. The Protestant churches number 36, Roman Catholic, 25, synagogues, 2, while of the schools and colleges, 16 are Roman Catholic and 9 Protestant. The Episcopal Church is represented by a cathedral and 12 churches; next comes the Presbyterian denomination with 10; Methodist, 7; Baptist, 3; Congregational, 2; Reformed Episcopal, 1; synagogues 2, German and Polish, and Spanish and Portuguese.



INTERIOR OF NOTRE DAME.

The property owned by religious denominations is worth many millions of dollars on which not a cent is paid for taxes. Notre Dame parish church alone cost \$1,000,000. It is 255 feet long by 135 feet broad, with seating capacity on the ground floor for 10,000 persons, and in the galleries for about 3,000. With the exception of the Cathedral of Mexico it is the largest church edifice in America. On account of its large size, the beauty of its works of art, many of them being rare masterpieces, its two towers, each 227 feet high with their chime of 10 bells and le Gros Bourdon, its giant bell, which weighs 24,780 pounds, and its grand organ that cost \$50,000, Notre Dame parish church is by far the most interesting of all the Montreal churches to the visitor. No one should fail to see Notre Dame chapel that cost \$300,000, which is reached through the doors on the right and left of the grand altar of the big church. On Christmas, Easter and other festival days the large church is crowded to its capacity.

The church, which is sometimes erroneously called Notre Dame Cathedral, is indicated on our map as No. 8. Windsor street cars going to the right from in front of the convention hall and Queen's hotel, pass the church. Adjoining it is the Seminary of St. Sulpice, built 200 years ago in the Romanesque style of architecture. There is an old wall surrounding the property, with its loopholes for defence against the Indians, that fills the visitor with amazement as he tries to imagine the state of affairs at that time, while all the development of 200 years is before his eyes.

It costs 25 cents to ride to the towers of Notre Dame in an elevator, but they can be reached by climbing 279 steps. The view is well worth the trip for on a clear day a distance of 30 miles can be seen. The bells of Notre Dame are known all over America. In one tower is "le Gros Bourdon," which weighs 24,780 pounds, is 6 feet high and measures 8 feet 7 inches in diameter at its mouth. It has a Latin inscription which means, "I was cast in the year of the Christian era 1847, the 202d since the foundation of Montreal, the first of Pius the Ninth's pontificate, and the 10th of the reign of Victoria, Queen of England. I am the gift of the merchants, the farmers and mechanics of Ville-Marie. I was cast in London by Charles and George Mears."

In the eastern tower are hung 10 smaller bells, beautifully toned in such perfect harmony that the most varied musical airs can be executed while they peal. They weigh from 6,011 pounds down to 897. Each bell of the chime was the gift of a member of the parish.

St. James cathedral, which is on the opposite side of Dominion square from the convention hall, is interesting because it is an exact fac simile of St. Peter's, Rome, although on a smaller scale, being exactly half its dimensions.

The Grey Nunnery, on Dorchester and Guy streets, a few blocks south of the exhibit hall, is open to the public from 12 to 1 every day. It is a large institution covering several acres.

Any one who desires to study 12th century civilization



NOTRE DAME PARISH CHURCH.

will find it at Oka, a few miles from Montreal. Here is a monastery of the Trappist Fathers, who are under solemn vows to be perpetually silent. Only the superior is permitted to talk, and he can grant dispensation to members of the order who come in contact with the outside world, to answer questions relating to the order. The other Trappists are ignorant of current events both local and general. Even the names of buildings near their monastery is unknown to them.

St. James Methodist church is the most costly of the protestant churches. The first St. James church was built on St. James street near the present post office. The Temple building, one of the finest office buildings in the city, stands on the site, bringing in a large revenue to the church.

Christ Church, on St. Catherine street near St. Philip's square, the Episcopal cathedral, is another prominent church that is well worth a visit.

Bonsecours church is the oldest church edifice in the city, having been built in 1771. It is at the end of Bonsecours market. On the tower is a colossal statue of Dame de Bonsecours (Our Lady of Good Help), while underneath the statue in the tower is a chapel reached by an elevator. On market days, Tuesday and Friday, the church is thronged with country folk, who leave their wagons loaded with produce in the street without a guard, long enough to pay their vows. Nothing is stolen in spite of its exposed conditions. This is also the church of the sailors, as it is near the harbor.

STREET RAILWAYS OF MONTREAL

Two systems of electric railways supply excellent transportation facilities for the people of the city and surrounding districts. The oldest and largest of these is the Montreal Street Railway Company, which, with the exception of one line, lies wholly within the city. The other company is an interurban, known as the Montreal, Park & Island Railway, which will eventually run all around the island, with a branch to the Ile Jesu, but which at present has only two lines in operation. The company owns no lines in the city, but has a traffic arrangement with the Montreal Street railway that permits it to run its cars to the financial center of the city.

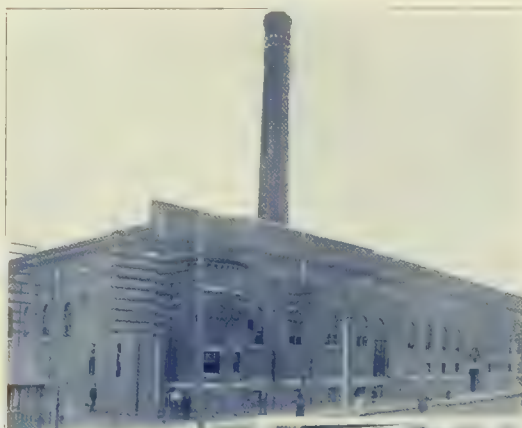
Montreal Street Railway.

In the early part of 1861 a charter was granted to the Montreal City Passenger railway to construct a street railway with the privilege of enjoying its franchise forever. The company had \$150,000 capital, and began operation November 26, 1861, with fifty horses and six cars, which were run for a distance of three miles on Notre Dame street. From the first the company met with great opposition from the carters, or cabmen, who resented the appearance of the horse cars, because they thought there would be no use for carters if the horse cars continued to run. This feeling grew so strong in 1862 that it broke out in a riot, when the carters attacked the cars of the company with paving stone and other missiles. It became necessary to call on the police for aid before the disturbance was quelled. Since that day policemen have been permitted to ride on the cars of the company free.

Receipts were \$75, \$80 and \$120 a day. On September 21, 1880, exhibition day, receipts were so large a special note was made on the records. The conductors collected \$1,559, the largest by \$528 of the preceding big day. Daily receipts now average \$3,400. During its existence the company has had its troubles, like those which beset all other companies. There have been difficulties in regard to extensions of the line, which were successfully overcome, and the officials have the satisfaction of knowing that the most stubborn objectors have seen the error of their position. In all fights of this kind the company has never failed to come out first.

It was generally believed that the company was making money. On this account the cupidity of several gentlemen was aroused, who determined to have a share of the nickels that the public was paying for rides. In 1873 the City Omnibus Company was organized and obtained permission to run omnibusses and to lay rails. Several busses were bought, which were operated for a while, but the people preferred the superior accommodations of the horse-cars, so the dream of the company to run omnibuses in the spring and sleighs in winter was not realized, the busses being sold to the street car company at one-third their cost.

Only one strike has occurred in the history of the company. This was only incipient, having been checked in the course of an hour, as the officials were prepared for it. Although the company has paid thousands of dollars to insurance companies, it has never got



POWER HOUSE MONTREAL STREET RAILWAY COMPANY.

even. The only sign of a fire was in 1887, when a stable with 108 horses were burned. A tramp got in.

Montreal has always presented peculiar difficulties in running a street railway in the winter on account of the heavy snowfall, which begins early in the season and stays late. In the early days a car similar to the one shown (now used as a sand car) was used until the snow covered the tracks. No attempt was made to clean them, as it was not considered worth while on account of the expense. The tracks and cars were abandoned in the winter, but the people were not compelled to walk, as sleighs like the one in the illustration were run over the lines of the road. Since the adoption of electric traction, it has been demonstrated that a street railway can be operated summer and winter in Montreal, which many believed was impossible.

CONVERSION TO ELECTRIC.

As it became necessary, additional lines were constructed, so that in July, 1892, when the work of equip-



NOW USED AS A SAND CAR.

ping the lines for electric traction was begun there were thirty-seven miles of single track and 1,300 horses. The company increased its capital to \$4,000,000, upon which it paid last year two dividends of 4 per cent each, besides accumulating a surplus of \$37,354.46. The business for the year ending September 30, 1894, showed a net profit of \$214,021.12, as against \$116,032.86 the previous year. The operating expenses during the whole year were 71.16 per cent of the receipts, which was cut down the last three months to 61.77 per cent. For the first six months forty-three horse-cars were operated each day, but the last half of the year the road was entirely operated by electric power. The gross passenger receipts for 1894 were \$896,090.89; for 1893, \$750,751.78, an increase of \$145,339.11, or 19.36 per cent; operating expenses, 1894, \$637,668.14; 1893, \$593,041.71; increase, \$44,626.43, 7.52 per cent; operating expenses, 1894, 71.16 per cent of car earnings; 1893, 79 per cent; net earnings, 1893, \$258,422.75; 1893, \$157,710.07; increase, \$100,712.68, 63.86 per cent; passengers, 1894, 20,569,013; 193, 17,177,952; increase, 3,391,061, 19.74 per cent; cars run per day, average 1894, 135; 1893,



ST. HENRY CAR HOUSE.

117. For the ten months of 1895, ending July 30, the increase over the same period of 1894 was \$167,000; increase in number of passengers carried, 4,153,000; transfers issued, 1894, 6,828,653, or 33.20 per cent of passengers; 1893, 5,094,113, or 29.65 per cent.

The Montreal Street railway operates about seventy-five miles of single track and 160 motor cars. The map of the system shows that the city is pretty well supplied. Many of the streets are so narrow that there is room for only a single track, which accounts for the parallel lines so close together, one being used on the up trip and the other on the down trip. A first-class service is given to the patrons of the company, which is appreciated, as is shown by the increase of 4,153,000 passengers carried this year as compared with last. The cost of construction was \$2,444,503.78, and of equipment, \$1,264,737.29; total, \$3,709,241.07.

By the terms of its franchise the company is required to pay the city 4 per cent on its receipts up to \$1,000,000, 6 per cent from \$1,000,000 to \$1,500,000, 8 per cent on \$1,500,000 to \$2,000,000, 10 per cent on \$2,000,000 to \$2,500,000, 12 per cent on \$2,500,000 to \$3,000,000, and 15 per cent above \$3,000,000. The company sells tickets 6 for a quarter, 25 for \$1; school tickets, 10 for a quarter; and 8 tickets for a quarter good from 6 to 8 a. m. and 5 to 7 p. m. The employees are mostly French Canadians. One of the requirements of conductors is that they shall speak both French and English. Rewards for employees are made every three months, two prizes being given to motormen and two to conductors, \$400 being appropriated every year for this purpose. This plan has worked so well that often there are



OLD WINTER EQUIPMENT.



ANCIENT HILL CLIMBER.

several who are entitled to the prizes. The lottery instinct is so strong that the winners are chosen by lot, all the badges being placed in a hat and two of them withdrawn. The prizes are awarded to the owners of these two badges.

The officers of the company are L. J. Forget, president; James Ross, vice-president and managing director; G. C. Cunningham, manager and chief engineer; E. Lusher, secretary and treasurer; J. F. Hill, comptroller; D. McDonald, superintendent.

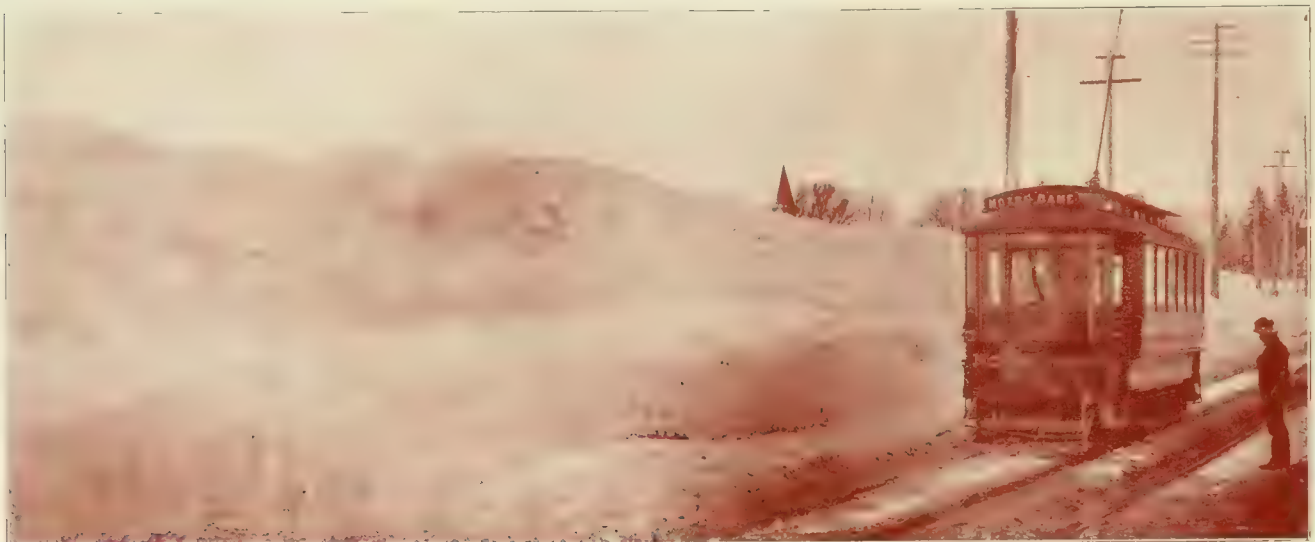
REPAIR SHOPS.

An old three-story stable in the business district has been converted into a two-story car barn and repair shops on account of its convenience to all the lines of the company. The ground floor contains the tracks, machine shop, blacksmith shop and a store room. The pits are of concrete with excellent provisions for drainage, while along the sides are steam pipes for drying out the cars in winter and in wet weather. There is an elevator, hydraulic pump, transfer table and other appliances. Below the concrete floor is a deep cellar. The second story is supported by iron pillars. Two 30-horse-power motors are used to supply power to the machines, which are of Canadian manufacture, current being taken from the trolley wire, and is never missed. The second

floor is given up to the car repair shop, paint shop and lumber store room. The belting is all from below so that the shops are clear of shafting. The company winds its own armatures, and has its own bake house which is in a fire proof building reached by a bridge, so there is no probability of the shops taking fire from that source. The lumber storage has no entrance except from the shop. The doors are tin lined, and the floor beneath it is occupied by the emergency wagon and crew.

No attempt has been made on the part of the company to build cars, the work of the shop being chiefly repairs, and the conversion of old horse cars into motor cars. Fourteen snow sweepers have been built at these shops, but do not differ from those in use on this side of the border. The city removes snow from the streets. The average snowfall for eighteen years has been 119 inches a year. A view is shown of the snow on the Notre Dame line, February 13, 1895, when there were drifts seven feet deep. Yet, in summer, the temperature is sometimes 90 and 92 in the shade.

The cars operated by the company are of Canadian manufacture, except some specimen cars from Amesbury, Newburyport, and Philadelphia. The motors are G. E. 800, Westinghouse 3 and 12, Thomson-Houston, Royal, Edison, Hochelaga, and a new motor made by the company after Westinghouse designs. The General Electric



SEVEN FEET OF SNOW—NOTRE DAME LINE.

K2 controller is used on all cars, which are supplied with a double brake chain for use in case of emergency on the hills; one chain being about 1½ inches longer than the other. The trucks, which have rigid frames, are made by the Canada Switch and Spring Company (Limited), K. W. Blackwell president, Charles Scott, Philadelphia, vice-president; C. H. Godfrey, secretary and treasurer. A sketch of the style being built for 21-foot closed cars is shown herewith. One drawbar of each car is fitted with a sleeve, which serves instead of a link coupling, attached in such a way that it cannot come off when not in use. The other drawbar is designed to slip into the sleeve on the drawbar of another car. Each sleeve has two holes for coupling pins, which register with a similar hole in each drawbar. The coupling pins are attached to the bars with chains.

POWER HOUSE.

The quickest way to reach the power house of the Montreal Street Railway from the convention hall is to go to the right on Windsor street to the Queen's Hotel, go to the right until the first street that crosses the railroad, cross the track, and continue on your way for a block or two, until you reach the power house, or you get on a Windsor street car, tell the connector you want to go to the power house, and he will transfer you to a car that goes near it. The first thing that will be noticed is that the engines are several feet above the street. On the opposite side of the street is an old fence with a black line near the top, which marks high water. Not that the overflow from the river reaches that point every year, but it did once, and there happened to be some tar barrels which broke and the tar left its mark on the fence. In order to be on the safe side the Montreal Street Railway Company built up the foundations for its machinery 7 feet above the street surface so that it would rest high and dry.

There are six cross compound condensing low speed engines with corliss valves 24 and 48 by 48 inches, each rated at 600-horse-power, built by a Montreal concern.

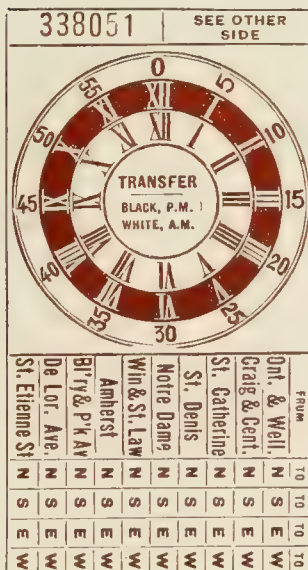


INTERIOR CAR HOUSE.

Three engines each drive 4 Edison 200-K. W. generators built by the Canadian General Electric, and the other three each drive 2 multipolar 300-K. W. generators. The wheel pits are constructed of sheet iron, to be absolutely water tight in case of a flood. In the basement are five condensers, each of which is supplied with an indicator attached to the piston, so that the engineer can tell at a glance from any part of the engine room whether they are working all right. Water for condensing and other purposes is obtained from Lachine canal, 700 feet distant, through a 20-inch pipe, waste water being returned to the canal through a pipe of similar diameter. The engine room, which is 235 feet long and 89 feet wide is provided with two 15-ton cranes.

The switch board, which was designed by H. R. Lockwood, the electrical engineer in charge of the power house, is made of terra cotta, and is 72 feet long by 11 feet high, 9 inches thick. This construction not only lessened the cost of the board, but has the additional advantage of being easily drilled, while it is made in one piece without joints, and does not require an iron frame. The board has 24 feeders, each supplied with a circuit breaker, a three-fold switch, ammeter and fuse. There are 12 circuits for the Edison machines and six for the multipolar generators, the instruments of Westinghouse design for the multipolar generators, being the same as those for the Edison, but of greater capacity. The rheostats are under the board. The remainder of the board is given up to the 24 feeders for feeding the system, which is divided into nine sections, each feeder having an ammeter, circuit breaker and switch.

The switch board is 10 feet from the wall of the station, giving ample room. Special round bus bars are used, which are \$300 cheaper than the ordinary bar. There is a tank lightning arrester on the trolley bar and another on the ground bar. The current is carried from the bus bars on rubber covered 2,500 circular mil cable, to a cupola, where it is connected with a 500,000 weather proof cable for outside work. The wire was furnished by the Dominion Wire Company. The cables are all the same length, and there are two miles of wire in the building,



MONTREAL STREET RAILWAY CONDITIONS

This is **NOT A STOP OVER** and is **NOT TRANSFERABLE**, and only good if passenger takes first car leaving junction where transfer is made after the time punched. The **DATE**, **TIME** and **DIRECTION** punched must be verified by passenger.

Ce billet n'est **PAS** un billet **D'ARRET** et n'est pas **TRANSFERABLE** et bon seulement si le passager prend le prochain char laissant la jonction où le transfert est fait après l'heure à laquelle il a été poinçonné. Le **DATE**, **L'HEURE** et la **DIRECTION** poinçonnées doivent être vérifiées par le passager.

D. McDONALD,
SUPERINTENDENT.

each of the multipolar generators has a lightning arrester separate from the tank arrester.

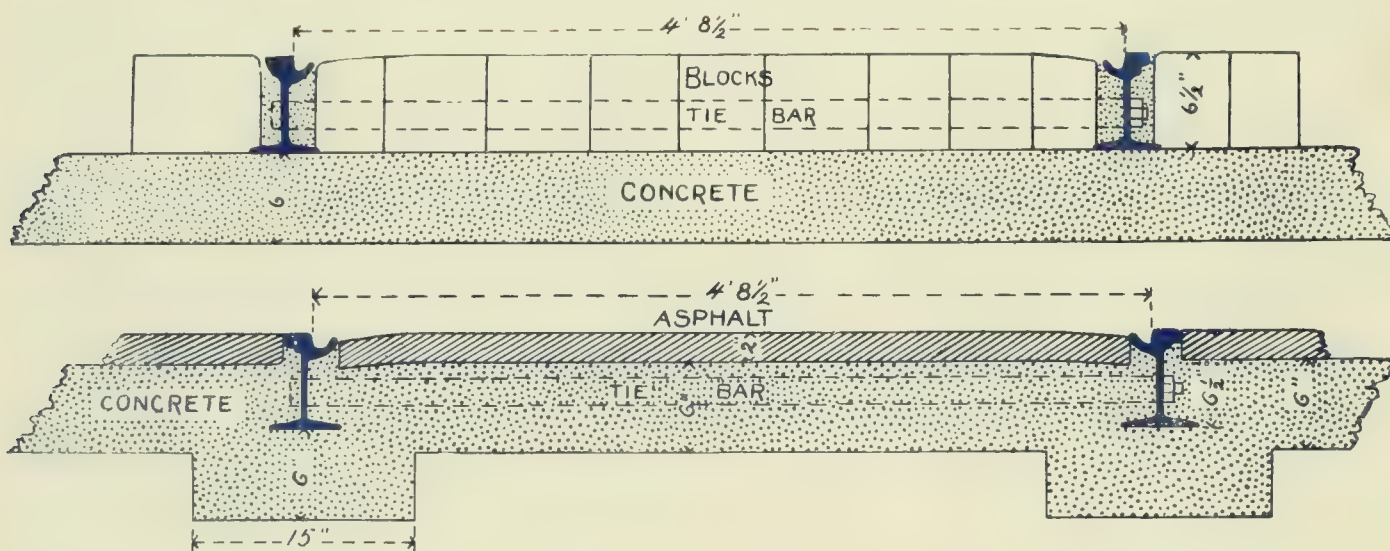
At the right of the main switchboard is a one-panel marble board, which is supplied with a Weston voltmeter, and station circuit ammeter. There is also a Bristol recording volt meter, a thermometer, barometer and a clock. Record is kept daily of the barometer and thermometer readings as well as the performance of the station, which will average from 35,000,000 to 38,000,000 watts a day. An annunciator box at the switch-board makes it possible to communicate with a similar box at each engine. When a signal is given an alarm rings until it is answered, and the engineer is required to signal back. The signals are "start," "stop," "stand by," "full speed," "slow down," "O. K."

The boilers were imported from England. There are 15 of them each rated at 350-horse-power. They consist of two tubes which present a large heating surface. The efficiency of the boilers is increased by the use of

are turned into the receiver at the end of every trip, when they are opened and counted. A record is kept of the contents, which is transcribed into a book for a permanent record. Every detail of car receipts and expenses is kept, as well as the pay rolls and expenses of all departments. Nothing is too unimportant to find its way on the books, which are kept in such a way that when they are examined it is impossible not to make comparisons with the situation of the corresponding day of the preceding year. Frequent reports are made to the manager of the exact conditions, who is able to make such changes as the statement shows to be desirable.

TRACK CONSTRUCTION.

The tracks of the Montreal Street Railway are so well constructed that they seem to be without a joint, so smoothly do the cars run over them. The rail is a sort of grooved girder, weighing 72 pounds to the yard, the design of Granville C. Cuninghame, manager and chief



STANDARD TRACK CONSTRUCTION.

Green's fuel economizers made by the Fuel Economizer Company, Matteawan, N. Y. The fuel consists of screenings, the ashes being removed from the pit by wagons.

In the overhead construction, Morris & Tasker iron side-poles are used. The trolley wire is 00 B. & S. gage, No. 9 B. & S. of three-ply galvanized iron wire for spans and guard wires, and 0000 copper for feeders and return. West End hangers, Brooklyn strain insulators, Aetna section insulators, and straight underrunning frogs and crossings are used.

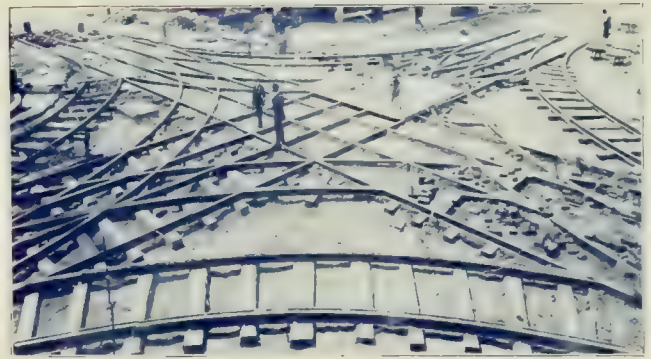
ACCOUNTING DEPARTMENT.

The system of accounts was compiled by J. F. Hill, comptroller of the company. They are based on the voucher principle, and have many subdivisions. There are two forces of accountants, one for day and one for night, so that it is possible if any one desires to know, to tell at 6 a. m. any morning what the condition of the company was at midnight. Fare boxes are used, which

engineer of the company. No difficulty is found in keeping it clear, as the flange of the wheel cuts into the groove and removes everything. Even in winter there is no obstruction from snow or ice on the level and it is prevented from accumulating on the steep grades, the steepest being 10 per cent, by the free use of salt. The latest construction is to lay the rails in six inches of concrete which is also filled in between the head and the base. Tie bars are placed at five feet centers, slots $\frac{7}{8}$ inch by $1\frac{1}{8}$ being punched in the rails to hold them. One end of the tie rod has a bolt head, and the other is threaded for a nut. Six bolt fish plates are used at joints, and the rails are bonded by trolley wire in malleable cast iron thimbles, which when driven home grips the wire and makes a firm union with the rail. Two courses of scoria block are laid on the outside of the rail, while the space between rails is paved with the same material. The remainder of the pavement is asphalt. When for any reasons it is desired to remove the rail, it is only necessary to take up the brick and unscrew the nuts from the tie plate, leaving

the asphalt untouched. Scoria blocks which are made from foundry ashes, are imported from England at a cost of 4 cents each. The diagrams explain more fully the construction. The two courses of blocks also prevent vehicles cutting a continuous line in the asphalt alongside the rail.

At the intersection of St. Lawrence and St. Catherines streets is the largest piece of track intersection work in the Dominion of Canada. It is built up in girder rail and connected with wrought iron fish plates. The joints are machine made, and the tongues are of hammered steel. The width of St. Catherines street between curb lines is 38 feet, while St. Lawrence street has a width of 43 feet: The radius of curb corners is 10 feet, radius of curve inside rail, 45 feet, minimum width devil strip, 4 feet, maximum width of devil strip, 8 feet 6 inches, angle of intersection 87.45° . Twenty-six tons of rails, 79 pounds to the yard, of $6\frac{1}{2}$ inches section, were used,



LARGEST PIECE OF SPECIAL WORK IN THE DOMINION.

Montreal. At present there are 18 miles completed, and 21 miles under way, and it is confidently expected that 50 miles will be constructed in 1896. Although the company has no franchise in the city, it has a traffic



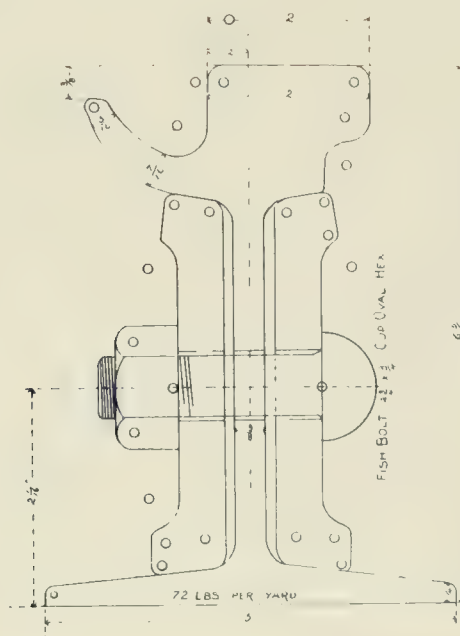
STANDARD TRUCK—MONTREAL STREET RAILWAY.

2,148 feet being required. Cedar ties laid close were bedded in concrete. The work was then spiked on ties, and wooden blocks were laid on concrete to bring level of street flush with top of rails.

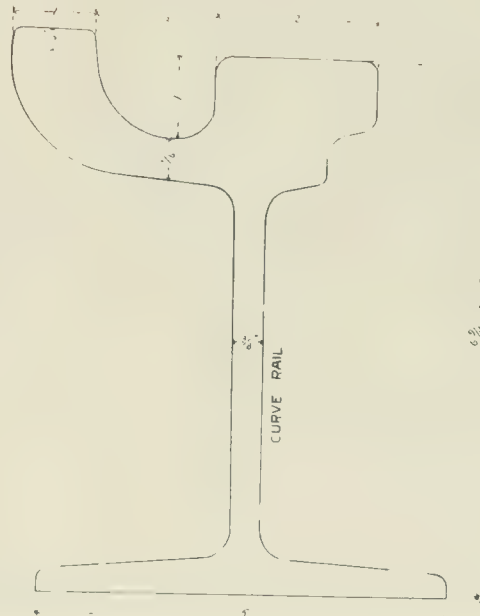
MONTREAL PARK AND ISLAND RAILWAY.

When its plans are completed the Montreal Park and Island Railway Company will have between 125 and 150 miles of track, lying wholly outside of the limits of

arrangement with the Montreal Street Railway, so that its cars go to the city on Bleury street, turning north on Craig, returning the same route. Crews of the Montreal Street Railway Company operate the cars while they are on the tracks of that company, collect a fare for a ride to the city limits, but collect no fares from through passengers in the car at the time it starts from the city limits over the lines of the Montreal Street Railway. The Park and Island Company pays $2\frac{1}{2}$ cents for each pas-



RAIL SECTION, (HALF ACTUAL SIZE)



senger carried on the tracks of the Montreal Street Railway, the latter company retaining all the money collected on its lines.

The Montreal Park and Island system is the idea of Albert J. Corriveau, who conceived the plan when electric traction was in the experimental stages. He was well acquainted with the Island of Montreal, with its

stay at home, many of them having never even seen the large city only a few miles distant from their homes. One of the results of this great interurban system will be to change the habits and life of these farmers by bringing them more frequently to the city and changing the lines of travel so that the different municipalities will come into a new and closer relationship with each other.



SCENES ON THE PARK AND ISLAND ROAD.

many municipalities each under a separate government, whose citizens had no intercourse with the metropolis, except by horses and wagons over a toll road. Mr. Corriveau saw the immense possibilities for business for an electric road, which should run around the outer edge of the island connecting all these villages with branches to the most populous in the interior, and an extension of the line to the Ile Jesu in Back river. The people are French, who have been for the most part content to

All of these changes will in time increase the business of the communities not only with themselves but with Montreal.

The chief business of the Montreal Park and Island Company will be for a while the carrying of freight, but there will also be considerable passenger traffic. The charter is practically perpetual on account of the skill of Mr. Corriveau, who had a provision in each of the ordinances that at the end of 30 years, the municipality



DOTTED LINE SHOWS PROPOSED LINES OF MONTREAL PARK & ISLAND COMPANY.

has the option of purchasing that portion of the line operated within its limits, or if it fails to do so the franchise shall be perpetual in the company. As no municipality will have more than a mile or two of track within its boundaries, it is not likely that any of them will buy, for a mile or two of the track of a large system wouldn't be worth much, as it would have no outlet. The name of the company was taken from an old steam road charter, which was bought up to save delay.

The country on the island of Montreal is rich in its agricultural products, supplying the city with the milk and most of the vegetables required and with a large amount of grain. In the winter a large business will be done in hauling ice, which is obtained from Back river. There will also be return freight from the city both summer and winter.

Before beginning construction, or even obtaining the franchises Mr. Corriveau and his associates had to overcome much opposition on account of the prejudice of the property owners. Most of it has been overcome, however, and that which still remains does not cut much of a figure, as it is sure to be dissipated, when active work is begun in those sections. On the two lines that are in operation no attempt has been made to inaugurate a



WHERE THE SNOW SHOE CLUBS MET.

freight or express service, but the passenger traffic is large. One of the lines known as the Outremont line, skirts the foot of the mountain, passing a corner of the Cote de Neiges cemetery. As soon as possible, a branch will be run into the cemetery grounds, when funeral cars will be operated. At the terminus of this line is Lumpkin's wine room, in an old building that has stood for 50 years. This used to be a famous resort for snow shoe clubs, as many as 15 clubs having been entertained in 5 nights. The favorite drink of the English was hot Scotch, while the French invariably called for whisky blanc or Etofe du pays to wash down cold beef and ham sandwiches. On the slope of the mountain near the Cote de Neiges cemetery Mr. Corriveau owns 130 acres, which will be made into a park.

The Back river line, which runs by the Lacrosse grounds, has the picnic grounds owned by the company. At the terminus the river widens out and makes a fine skating pond, which is kept clear by the company. There is a car shed at this point large enough to hold two cars. It is supplied with a pit as the last car at night remains until early morning. It is here that the company expects to get the larger part of its ice-hauling business. On this line is the beautiful convent at Sault-au-Recollet, a magnificent property owned by the nuns of the Order of the Sacred Heart.

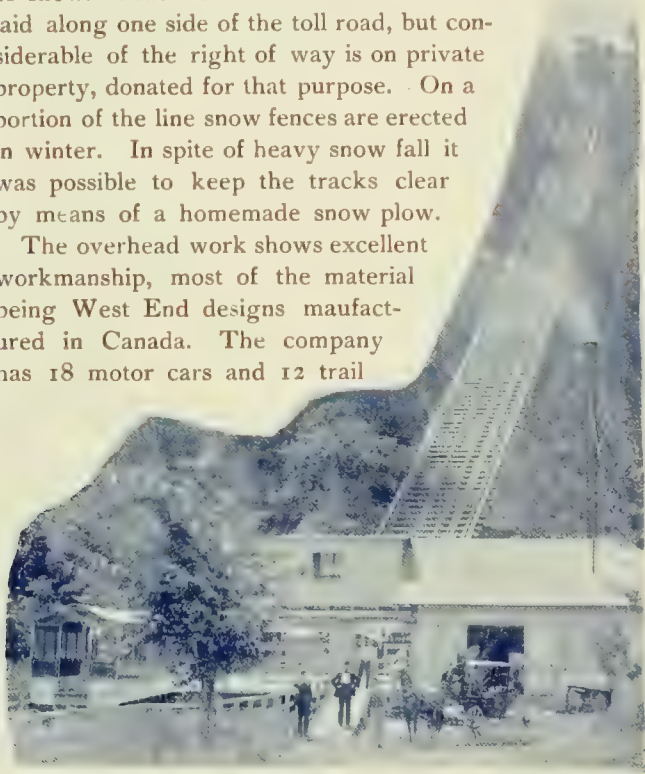
The Outremont line and the Sault-au-Recollet, or



CONQUERING SNOW WITH A HOMEMADE PLOW

Back river line are each about six miles in length, a portion being double track. The rails are 56-pound T, 4¼ inch Canadian Pacific section, laid on ties and ballasted with rock which was secured from quarries along the line. The tracks are elevated above the road on account of snow. Much of the distance the track is laid along one side of the toll road, but considerable of the right of way is on private property, donated for that purpose. On a portion of the line snow fences are erected in winter. In spite of heavy snow fall it was possible to keep the tracks clear by means of a homemade snow plow.

The overhead work shows excellent workmanship, most of the material being West End designs manufactured in Canada. The company has 18 motor cars and 12 trail



MOUNT ROYAL INCLINE.

cars made in the Dominion, some of which are mounted on Peckham trucks and supplied with Standard air brakes. The other cars are mounted on Blackwell trucks. The vestibule cars have a seat in the vestibule for smokers, but no one is permitted on the platform with the motorman. Several new long interurban cars will be built by the company, but the design has not been adopted.

The power house of the company is a temporary affair in the exhibition grounds, near the crystal palace, which was dedicated on the Prince of Wales' only visit to Canada. A new power house will soon be built at a point that will be most economical for the operation of the various lines of the system. The site has not been chosen. The power is generated by two 200-K. W. and one 100-K. W. generators made by the Royal Electric Company. The engines and boilers are of Montreal manufacture. The motors are those of the Royal Electric Company, and Westinghouse, the controllers of the latter company being used.

It is a delightful ride over the lines of the Park and Island road, which can be determined by a glance at the photographs of views along the line. There is a great deal of pleasure riding. The officers of the company are L. Beaubien, president; J. R. Thibaudeau, vice president and managing director; R. L. Gault, treasurer; A. J. Corriveau, general agent; Henry Holgate, manager.

CANADIAN STREET RAILWAYS

In visiting Canada, street railway men from the States will find nothing radically different from the usual practice on this side of the international boundary line. Street railway apparatus is, however, built almost entirely in Canadian shops and copied from the common designs used in the United States. Our Canadian friends are not so radically aggressive in their methods as we are—due, no doubt, to their more intimate connection with the old world—but whatever work is done, is done substantially and with a view to long service. On this account the introduction of electric traction has not come quite as rapidly as on this side but there are now very few roads that still use horses. Considering the population of Canada and the small number of great cities from which electrical industries derive their greatest income, the development of the manufacture of street railway apparatus has been something wonderful. Taken as a whole it is probable that the Canadian roads furnish proportionally fewer examples of poor engineering than those in the United States. As a rule all work is carefully planned by men competent to do it, and acquainted with the business, which is more than can be said of some undertakings on this side.

There are between 400 and 500 miles of electric road in the Dominion, owned by twenty-six companies. There are in addition seven companies that operate lines with horses. While construction operations are not being conducted with as much activity as in the United States, there are several projects under way which are just as important to the Dominion, as the development of certain franchises is on this side of the line.



Y. M. C. A. BUILDING.



Several of the street railway men of Montreal have been identified with the street railway enterprises of other Canadian cities, and are the fathers of the electric railways in Canada. James Ross and Granville C. Cunningham, of the Montreal Street Railway Company are the most prominent, having planned and constructed the most important work, and are constantly making improvements in methods of construction. Much of the material and equipment of Canadian street railways is made after their designs, which in many particulars are way ahead of American designs.

James Ross, vice-president and managing director of the Montreal Street Railway Company, who is well known as an eminent civil engineer and successful railway constructor, was born in the north of Scotland some 45 years ago. He learned the profession of a civil engineer in Scotland, coming to Canada in the latter part of the seventies. He was first identified with the construction and management of the Victoria and Credit Valley Railways, extending through a considerable length of the southwestern part of Ontario, and brought that enterprise to a successful conclusion. The work, however, that has made his name widely known is that of the construction of the Canadian Pacific Railway across a considerable portion of the prairies and through the Rocky Mountains and the Selkirks into British Columbia. The great engineering difficulties that were successfully overcome in the mountain region, and the rapidity with which the construction was pushed through to a conclusion, established Mr. Ross's reputation as an engineer and constructor of the first rank. Since the conclusion of that work Mr. Ross has carried out extensive railway contracts in Ontario, Quebec, and in the northwest, and latterly has taken up the construction and operation of street railways in various Canadian cities. The street railway systems of Montreal, Toronto, Winnipeg and St. John owe their successful construction and operation largely to Mr. Ross's directive ability. Mr. Ross is president of the Dominion Bridge Company, situated at Lachine, near Montreal, a company doing by far the largest business of its kind in Canada. He is a director of the Toronto Railway Company, president of the Winnipeg Electric Railway Company, and president of the St. John Railway Company.

Granville C. Cunningham, M. I. C. E., is a member of the executive committee of the American Street Railway Association. He learned the profession of a civil engineer in Edinburgh, Scotland, and on leaving his native land, in 1870, first went to Honduras, in Central America,

and was engaged for some months on a projected railway in that country. Since coming to Canada, in 1872, his work has been largely connected with the chief railway schemes of that country. In 1889 Mr. Cunningham was appointed assistant city engineer, and afterwards city engineer, of Toronto, Can., and it was then that his attention was directed to electric street railways. In 1891 Toronto was about to introduce an electric system, and Mr. Cunningham was required to visit the various cities of the United States and to report to the city council upon the best system to be adopted in Toronto. It was upon his report that the system now established there was introduced. In 1892 he was appointed chief engineer of the Montreal Street Railway, and the work of converting that system from a horse to an electric one has been carried out under his direction. In 1893 he was appointed manager and chief engineer of the Montreal Street Railway, which position he now occupies. In 1878 Mr. Cunningham was elected a member of the Institute of Civil Engineers, of London, Eng., and he was among the first members of the Canadian Society of Civil Engineers. Mr. Cunningham is the inventor of the method of laying tracks without ties, the method of paving, and the designer of the rails in use by Montreal Street Railway Company, all of which is described elsewhere in this issue.

L. J. Forget, president of the Montreal Street Railway Company, is a leader in financial operations, being known throughout Canada and in speculative circles of the United States, as one of the luckiest and pluckiest men in the Dominion. He has been interested in some of the largest financial deals ever put through in Canada. Mr. Forget is popular with his business and social associates. Born in March 1853 at Terrebonne, near Montreal, he was educated at the Masson College. He started as an office boy, little thinking that at the age of 42 he would be president of the Montreal Stock Exchange, president of the Montreal Street Railway Company, and president of the Richelieu & Ontario Navigation Company, the steamboat company that runs passenger steamers from Toronto to Montreal, passing among the Thousand Islands and through the rapids of the St. Lawrence.

E. Lusher, the secretary and treasurer of the Montreal Street Railway Company, is the oldest street railway man in the city. He is an old and well tried officer, having during the last 18 years filled the important office of secretary and manager, during the existence of the horse railway system, and now has the more responsible position

of secretary and treasurer, since its conversion to an electric railway. Mr. Lusher has been a part of the street railway development of the city and is full of interesting reminiscences of its early events. In 1885 Mr. Lusher was elected a vice-president of the American Street Railway Association. His presence at the various gatherings was always welcome, not merely because he was the worthy representative of the principal street railway outside of the United States, but on account of his genial social qualities. To Mr. Lusher is mainly due the taking place this year in Montreal of the annual convention, for in 1893 at Milwaukee he strongly urged the association to come to this city.

James F. Hill, comptroller of the Montreal Street Railway Company, was born October 15, 1861, and has had a large and varied experience as an accountant in England and Canada. For 8 years he was construction accountant of the Canadian Pacific Railway Company, during the conversion of its main line and branches. The city of Toronto desired his talents, and for two years he was accountant for the board of works of that city. When the Montreal Street Railway was converted to electric in 1893, Mr. Hill was called to the position of comptroller, a new position. Mr. Hill devised the comprehensive and complete system of accounting for the company. He also reorganized and introduced the present system of accounting of the Richelieu & Ontario Navigation Company to which company he acts as special auditor.

Duncan A. McDonald started in the employ of the Montreal Street Railway Company in 1881, as a driver. He was transferred from the front to the back platform of the car, where faithful and honest work was rewarded by a promotion to inspector. In 1886 he retired to go into other business, but kept his eyes open to what was going on in street railway circles. He heard of the project of converting the Minneapolis horse lines into electric, then he conceived the idea that the Montreal lines would have to be changed some time so he determined to be in position to have a part in the reconstruction. Mr. McDonald went to Minneapolis, remaining until 1892, when he returned to Montreal, to 1,350 horses, being appointed head roadmaster. In June 1894 Mr. McDonald was made superintendent of the biggest electric railway system in the Dominion of Canada.

Albert J. Corriveau, financial agent of the Montreal Park and Island Railway, has had an interesting career, and few hold a higher place in the esteem of Montreal's business men. He is a self made man whose greatest ambition is to overcome difficulties and to conquer opposing forces. When quite young Mr. Corriveau went to New York, and engaged in the study of silk manufacturing, mastering every detail, which resulted in the establishing of the Corriveau silk mills in Montreal. Next he turned his attention to electric science, and it would be difficult to find any one who has done as much to bring electricity into use for light and motive power in Canada. Holding a responsible position with the Royal Electric Light Company, of Montreal, Mr. Corriveau became a member of the national Electric Light Associ-

ation, serving that organization on the executive board. He secured the adoption of Montreal as the meeting place of the 1891 convention, which waked up the people of Canada to the advantages of electric light and electric traction, resulting in millions of dollars being used in electrical work, part of which was the adoption of electricity by the Montreal Street Railway Company. Mr. Corriveau is the father of the Montreal, Park & Island Railway, which will eventually run around the Island of Montreal, bringing the remote regions into rapid communication with the great metropolis. Mr. Corriveau has a beautiful country home on the Richelieu banks, which he has decorated in honor of the American Street Railway Association. In addition to his other accomplishments, Mr. Corriveau is an orator. Although of French birth he is as facile in his use of English, as with his native language.

Henry Holgate, general manager of the Montreal Park & Island Railway, is a civil engineer by profession, who has made a specialty of track construction from the time he graduated. His first important work was for the Grand Trunk Railway of which he was chief engineer of a 500 mile section. He is a member of the Canadian Society of Civil Engineers. Mr. Holgate came to the Montreal, Park & Island Railway, from an important position with the Royal Electric Company. His experience has been of great value in the construction of the road. Mr. Holgate has invented several devices for use in construction work, among them the Holgate tie plate, which is being patented, and is designed to add to the life of ties.

L. Beaubin, president, J. R. Thibaudeau, vice-president and managing director, R. L. Gault, treasurer of the Park & Island Company, are wealthy and prominent citizens of Montreal.

Although not a street railway man, Percival Walter St. George, the city surveyor of Montreal, has had much to do with the construction of the Montreal street railway, as all the track and overhead work was subject to his approval. Mr. St. George will be a prominent member of the local committee on entertainment. He was born at Forres, Scotland, in 1849, and came to Canada in 1866. He was a pupil of Alex McNab, chief engineer of the Province of Nova Scotia. He has served as engineer for the North Shore Railway of Canada, Norfolk & Western Railway, Virginia, and Northern Colonization Railway, Ottawa. He was assistant engineer and deputy city surveyor of Montreal from 1875 to 1883, when he was appointed city surveyor, a position which he holds to-day, having survived various administrations.





G. C. CUNNINGHAM,
Manager Montreal Street Railway Company.

L. J. FORGET,
President Montreal Street Railway Company.

R. I. STONEWALL JACKSON,
Local Secretary Committee of Arrangements.

J. F. HILL,
Comptroller Montreal Street Railway Company.

J. O. VILLENEUVE,
Mayor.

LORD ABERDEEN,
Governor General.

P. W. ST. GEORGE,
City Engineer.

JAMES ROSS,
Vice-President Montreal Street Railway Company.

A. J. CORRIVEAU,
Montreal Park & Island Railway Company.

D. A. McDONALD,
Superintendent Montreal Street Railway Company.

E. LUSHER,
Sec'y and Treas. Montreal Street Railway Company.



It was at Young's Hotel, Boston, at a quarter past two (in the afternoon) of December 12th, 1882, that H. H. Littell, of Louisville, called to order a gathering composed of fifty-six street railway officers. It was hardly a reunion for any of them; as up to this time the street railway men of one city knew little, and cared less, about those of another: and in most cases those from the same city were so well acquainted that both parties found it more agreeable to select seats on opposite sides of the room. There was anything but the strong fraternal

can Street Railway Association of the United States and the Dominion of Canada." The chairman then attempted to name a committee to ring up some by-laws, and so great was the modesty of the delegates in those days nine gentlemen successively begged off:—and they were all prominent men too. Finally Thomas Lowry, of Minneapolis, was caught in the toils and it was a comparatively easy matter to add the names of Charles Clemmshaw, Troy; H. H. Littell, Louisville; Walter A. Jones, Brooklyn; Moody Merrill, Boston; D. F. Longstreet, Providence; Julius S. Walsh, St. Louis; T. H. Robillard, Montreal; H. M. Watson, Buffalo; Abner C. Goodell, Salem; William J. Richardson, Brooklyn; and Tom L. Johnson, Indianapolis.

The next day the committee turned in its report having



JOEL HURT, ATLANTA—PRESIDENT A. S. R. A., 1895.

feeling of regard and confidence which has since cemented hundreds of most delightful and priceless companionships. The permanent chairman, Hon. Moody Merrill, of Boston, little realized to what extent his prediction would be carried, when in his opening address he said, "I would say that, probably our association is not to be formed so much to *protect* our interests as to *promote* them."

Letters were read from twenty-two companies prevented from sending delegates, but pledging their support. As all these roads were prominent ones, it shows how much closer tied down the manager was in those days than now, and how, for want of capable assistance he was unable to leave his lines even for a few days. Fortunately this has changed.

Mr. Hazzard, of Brooklyn, offered a resolution to form an association, suggesting that its name be "The Ameri-

can Street Railway Association." This created quite a lively discussion. Some wanted it "North American," etc., but when it was announced that the intention was to include the whole western hemisphere, and that it was expected some of the South American roads as well as Canadian, would want to join, the name was adopted. The by-laws were the subject of a lengthy discussion, particularly the division of dues which the small roads wanted prorated on a car basis, and the large roads insisted should be uniform. However all differences were harmoniously adjusted and the meeting closed with a magnificent banquet tendered the guests by the presidents of the Boston roads.

The greatly lamented Calvin Richards presided, and closed his welcome to the feast with the following words, so characteristic of his generous and warm hearted nature: "Above everything else, let the members of the

association foster a brotherly regard for each other, so that when we meet in strange cities, we shall be as brothers. That is what we should be. There shall be no north, south, east or west with us."

And so the association was born; and the convention ended; and the delegates separated to meet the following October in Chicago. But not one of them had the faintest conception of the progress, consolidations, mechanical inventions and invested capital, or of the palace cars, high speed, and army of intelligent employes, which would be an accomplished fact when the association should assemble in Montreal in 1895.

An event as sad as it was unexpected has been the death of the secretary and treasurer, who had held that office continuously since the organization of the association. William J. Richardson will be greatly missed and

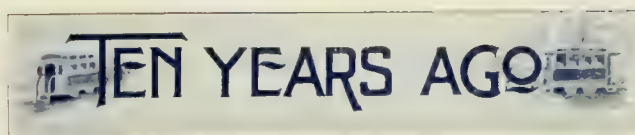


his loss comes as a personal one to all. His official action was always full of dignity to which was united a warm heart and kindly disposition which made him so widely esteemed. No one will be more greatly missed at the coming meeting than he.

The present officers are:—

Joel Hurt, President, Atlanta, Ga.
John N. Partridge, Secretary and Treasurer, pro tem, Brooklyn, N. Y.
W. Worth Bean, First Vice President, St. Joseph, Mich.
John M. Cunningham, Second Vice-President, Boston, Mass.
Russell B. Harrison, Third Vice-President, Terre Haute, Ind.
Executive Committee: the above and H. C. Payne, Milwaukee; G. C. Cunningham, Montreal; W. H. Jackson, Nashville; D. G. Hamilton, St. Louis and Chicago; and John M. Partridge, New York.

About the first thought that comes to those proposing to attend the convention is, "I wonder will it be cold?" This cannot be answered categorically because the weather is subborn and does as its pleases. Even those who are paid to foretell what it will be wouldn't draw more than one day's pay in another job, if they didn't show better results. Last year the week of October 18 was fair and started in at 42° at 7 a. m., reached 58° at 3 p. m., the coldest day being the 19th, when the thermometer read 37° and 54°. Better take flannels and a heavy coat.



Ten years ago! Short indeed as we retrospect, but how long in changes, for greater progress has been accomplished during the last ten years than in the preceeding fifty. In 1885 the convention met in St. Louis; the weather was perfect; the attendance large; good papers were read; the hospitality of the St. Louis roads was extravagantly lavish and unsparing; and the festive supply man for the first time appeared in all his glory and with the largest exhibit ever made. The new woman, too, appeared, though several years ahead of time, in the person of the lady treasurer of the Des Moines road, and the lady owner and manager of the New Albany, Ind., lines. Mr. Richardson, Sr., with his usual thoughtfulness, upon learning these delegates had come to attend the convention, but were somewhat embarrassed at the prospect of their lonesomeness, moved they be invited to sit in the convention. The motion was quickly passed, and the "Deacon" commissioned a committee to go and escort them in.

As an illustration of the evolution which has been going on, a few of the subjects, then of vital importance, are now amusing. Nearly one whole day was devoted to the consideration of such startling matters as "glanders," "acute glanders," "chronic farcy," "pneumonia," "gangrene," "nervous colic," and "wind colic."

For the first time electricity as a motive power, was discussed, and as we look backward there was some vigorous groping in the dark. There was a day banquet and another at night; a full day's carriage drive; boxes at theatres, Gilmore's band and altogether "one continual round of pleasure." Calvin Richards, who was the finest presiding officer the association ever had, gave full play to his fount of wit and eloquence, one moment calling forth peals of laughter to be followed by a general moisture of the eyes that no one seemed ashamed of.

To those who have been in the harness a long time a few reminiscences of the days ago will bring back many pleasant but forgotten incidents; to those of the latter day saints a picture of what used to be will be valuable.

Sharp's Cow Bay Sand.

Did you never see a witness on the stand, who when driven into a corner by the lawyers, would put an end to the whole business with three words? "I don't remember."

But if you and I had our feet under the same mahogany, and you were to relate some occurrence of years ago, it is altogether likely that the next remark from the opposite side of the table, would be, "That reminds me."

Everybody remembers that about the period you refer to, our excellent Mayor Hewitt, was engaged in an onslaught against the centre-bearing rail; but perhaps some of our friends have forgotten that that same rail was known for years as the "Hewitt rail." I have been told that His Honor was once reminded of this fact, and

his reply was, "*Then I was a manufacturer of rails, now I am Mayor of the City.*"

I remember once, we were all summoned before an Aldermanic Committee in the matter of sanding the tracks. Among the number, was Jacob Sharp.

In the course of the inquiry, the "grim visaged" chairman, thought to spring a surprise on Mr. S. by pointedly asking him if he did not use salt on his tracks. The answer was, "We use Cow Bay sand, which is remarkable for its saline properties."

An Englishman calls every thing which is disagreeable, "beastly."

If we railroad men have not "fought with beasts at Ephesus," we were engaged ten years ago in fighting unjust taxation, which certainly dates back to Augustus Cæsar, besides all sorts of unreasoning prejudice in the minds of law-makers, jurymen and "the rest of mankind."

The fight is still on. Yours,

D. B. HASBROUCK.

Metropolitan Street Railway Company, New York.

Always a Busy Man.

I am in receipt of your request in which you advise me that you are to publish something referring to street railway business ten years ago in comparison with the present time, and ask me to "contribute a few words."

As I look back to 1885 I find many of the managers' duties very similar to those of the present time. There is the same need for a "School for Conductors," and for the compiling and enforcing "Rules and Regulations" as when Calvin A. Richards, of Boston, and D. F. Longstreet, of Providence, talked and wrote upon these subjects at the Convention of 1885.

Motive power has changed, making necessary the mechanical engineer in place of the stable and horse expert, also much more care must be given to track construction.

A successful manager must always know his whole business, and the difference now is that, in addition to being a good disciplinarian and organizer, he must have a good degree of mechanical knowledge in place of the horse knowledge formerly necessary.

The public demands are much the same, only perhaps more intensified, and altogether the time of a conscientious manager is still fully occupied.

J. E. RUGG.

Citizens Traction Company, Pittsburg.

"When the Girder Rail Arrived."

Some of my recollections of ten years ago, during the meeting of the American Street Railway Association, then held at the Southern Hotel, at St. Louis, did you say? Well, I recollect among other matters, that we discussed whether it was advisable or not to use a girder instead of a tram rail. The discussion was quite warm and prolonged on this subject. Calvin Richards, of Boston, was the warmest advocate of the girder rail upon the floor of that meeting. You will recollect that he got up

a type of rail which he called the Richards rail, which was a somewhat modified type of the old English grooved rail. A great many thought that the idea was an extravagant and entirely unnecessary one.

At that meeting the only motive power which seemed at all practical was cable and horses. After the prolonged discussion upon rails, the feed and care of horses was taken up and discussed with all the minute care and thoroughness which you would expect from a class of thoroughly informed men who had carefully gone over all the details of this subject in their practice for some years past. Electricity came in for a small share of the interest of this meeting, but it seemed to be almost the unanimous conviction of those present that whatever might be accomplished for street railroads in the way of motive power by electricity was so slight and seemed to be so visionary that it did not excite the interest that either horse or cable power did. I remember very well in walking out one of the streets in St. Louis where they were putting in a new cable line. They thought that it was a well-constructed railroad and would be a durable one, but I understand they found out in practice quite the reverse. I cite this as an example of the difference in the views of railroad men obtained by the actual practice in the practical operation of our railroads in so short a term of years. All of our modern practice trends to putting in a still heavier construction each year, and while ten years ago the idea of a girder appears with the Richards rail with a weight of 56 pounds to the yard was an extravagant waste of iron and steel, that now a 90 pound rail ten years later for a straight track and curved rail one hundred to one hundred and ten pounds to the yard does not seem at all extravagant, but in fact necessary in the operation of our electric motors. When we look back over this period of ten years and see the complete revolution in every branch of street railroad work, and see that we are not only pulling our cars by a method which appeared at that time to the brightest minds in our association to be only a visionary object, that we are not only now pulling them but also lighting and heating them by the same power.

Reflecting upon these things a person feels timid about making any forecasts of what the next five years may bring forth. There is one thought that occurs to us in speaking of the future and it is made more practicable from the very nature of the power we use now for propelling our cars and that is, in modern street railroad practice that we create quite a large proportion of our summer travel by building parks to be operated by the street railroad companies themselves, at a convenient distance from our cities, and in placing in them all the different attractions which will make it pleasant for the patrons of the road when they desire to spend a few hours in a little pleasure expedition. Most all street railroads can create in this way, for at least five or six months in the year, enough travel to warrant them in giving it their careful attention.

The desire for trolley parties in one or more car loads also seems to be opening up quite a source of revenue

for various railroads. I recollect my first attempt in this direction of four years ago, when I gave a party to some twenty of my friends on a special car operated by electricity and going to the end of our line, had a caterer come aboard the car and serve our dinner. It was more novel then than at present and attracted considerable attention. But there is one thing which we can all see in constructing our railroads in the future, that we cannot put in our tracks too heavy a rail or place our ties too close together. This one feature can be followed in all cities and on all railroad property with a great deal of profit.

In the matter of the style and size of the car of course there is a very large range of opinion, but nobody can possibly adopt a standard which would do for all cities. The different conditions of climate, width of streets, grades, curves, etc., would preclude anything like a standard in the way of the car. I also think that in the matter of power house construction we are all coming to direct connected engines and generators. I feel that from the three years practice on our system in Cleveland that it is what we should have all over, in order to get economy in operation.

The subject of accidents and how to avoid them and also how to settle them up is a very perplexing one to all managers of street railroads. The modern tendency of newspapers in many of our cities is to write a sensational account of all accidents, and most all of these sensational articles reflect severely upon those operating the road, or they at least find fault with the power or speed of the car. But I have never yet talked with a newspaper man when on his way to or from his home that ever thought the car was traveling too fast. I think this fault comes principally from the fact that their aim in writing these articles is to color them so highly as to excite and create in their readers something out of the usual tenor of reading matter, hoping to create a demand for the sale of their papers, regardless of what may be true and what may have caused the accident. I believe it is the experience of most companies, however, that in proportion to their miles run there are less accidents when cars are operated by a fast power than when they were drawn by animals. It is amusing sometimes, more particularly in some of the New York City papers to read of the accidents which happen on the electric roads over in Brooklyn and some of the adjoining cities, always reflecting upon the party running the car and the power upon which it is operated as the prime and only cause of numerous deaths; never for a moment admitting the possibility of any carelessness by the injured party and always forgetting to notice the numerous accidents which occur in their own city upon horse railroads. When the public get educated to use an equal proportion of carefulness that the men do in operating our cars, we will have but very few accidents compared with what we have now.

J. B. HANNA.

Cleveland City Railway.

A Manufacturer's Recollections.

The first convention held in Boston in 1882 was in many respects one of the most enjoyable. There was such an uncertainty about it, and the anxiety of the promoters was so intense, that when finally the association was formed every body was happy and relieved.

The supply men, as usual, were there and did much to make the first meeting a success. The street railroad men were and are to this day noted for their modesty, and as most of those in attendance at the convention met for the first time, the supply men, good natured and irrepressible, were useful in introducing the former to each other.

In those days the street railways of Boston were not consolidated, there were a number of independent companies and rivalry among them, I think, was strong. There was some question as to whether they would all unite in the plan of forming the association, and while



CONVENTION HALL—MONTREAL.

I think some did not participate in the business proceedings of the convention, all were deeply concerned as to the banquet; was there to be a banquet in the evening? and would the supply men be invited? were the vital questions of importance the last afternoon.

Finally the hour for the banquet came and the supply men were very much in evidence; at first it was as formal and dignified as the most sedate could have desired, but as the evening wore away and the magnificent speeches drew to a close, the meeting was in the hands of the members. In the meantime our friend Kerper, of Cincinnati, had gradually worked himself to the front until he sat next to the master of ceremonies, and materially aided in bringing about a spirit of good fellowship and feeling that I have never seen equaled at any of our meetings since. Everything about that Boston banquet was good; the speeches were eloquent and interesting, the service was prompt and efficient, the feeling of each guest to the other was kind and friendly.

Among those who were there that I recall, were Moody Merrill, Calvin Richards, Samuel Little, now president of West End, the president of the Cambridge Road, who

made the speech of the evening, and I think the best I have heard at any of the conventions; Tom Lowry, H. H. Littell, Walter Jones, H. M. Watson, Hazzard, of Brooklyn, Hathaway, Atwood, Clegg, Walsh, Rugg, Longstreet; but this paper would be too long if I were to include them all.

The only exhibition of supplies that I remember was of the girder rail, made by Tom Johnson and A. A. Moxham. It must be pleasant for them to recall the predictions of failure of the rail and why it would not succeed, in the light of the years that have intervened. I have good reason for remembering the Boston convention for did I not receive while there an order for forty bob tail cars from Lowry, of Minneapolis?

The second convention at Chicago was also an interesting and valuable one, but it lacked the spirit of good fellowship of the first, and there was no exhibition of supplies made. The members of the convention visited the cable plants of the Chicago City Railroad, and the immense horse stables of the West Side Road. The banquet, cold and formal; the speeches poor and every one I think was glad it was over. C. B. Holmes, the president of the Chicago City Railroad, said he had told his stockholders that notwithstanding the vast sum spent by them in putting in cable system, they might expect to abandon it all in a very few years for something better.

The third convention at New York I did not attend. The fourth at St. Louis was the first at which any thing like a display of appliances was made. The first floor of the Southern Hotel was practically given up to supply men, and they made good use of it. Stephenson, Lewis & Fowler, Brill and others made interesting exhibits, but the local car builders did nothing but entertain. The banquet is often referred to as a pleasant one, but the speeches were poor. Gus Williams, the comedian, was present. The lunch at the fair ground during convention week was a delightful one. The roads in St. Louis were all tied up by a strike.

The next convention at Cincinnati was an interesting one, the exhibit of supplies was large. It was at this convention our company exhibited a complete car, in which many novel features, among other things spring roller curtains, electric call bells, spring seats, and while this was pronounced by the public of Cincinnati as too rich for Cincinnati blood, I am glad to say the lines of that city are to-day equipped with cars far above anything expected or hoped for at that time.

The convention at Philadelphia I was unable to attend. The one at Washington was exceedingly interesting and was clearly dominated by the electrical and other supply men. The question of electricity was the all absorbing one, and the exhibition of supplies in Willard's Hall and on the streets was very large. Several car builders, among them Pullman, Lewis & Fowler, exhibited complete cars. It was here the pleasure of the banquet was marred by the noise of the waiters and dishwashers. There was such a rattling of dishes it was almost impossible to hear the speakers. It was also here that our old

friend Winfield Smith, of Milwaukee, referred to the necessity of street railroad men having "Sand in their craw as well as on the track."

At Minneapolis there was a very enjoyable time; electricity being the principal subject discussed; comparatively few exhibits were made.

The Buffalo meeting in some respects was the most pleasant; the arrangements for entertainment were excellent, and the day spent at Niagara Falls, as well as the banquet in the evening, will long be remembered by those present.

The Pittsburg meeting I am sure made a lasting impression on all present. The displays made by the electrical people were beautiful and interesting, the conveniences for exhibition were not of the best, but this was more than accounted for by the quantity and quality of the display. On the levee in front of the hotel, Brill, Lewis & Fowler and ourselves exhibited full size street cars. It was here the accelerator was first introduced. The trip on the river was appreciated and many compliments were paid Mr. Holmes and others for the perfect arrangements for accommodation of the guests.

The Cleveland convention was made memorable by the display of supplies and appliances, which was very large and interesting. Cars were shown by Brill and ourselves; while several fine private cars owned by the electric companies were made use of by members. The trip to the Walker Manufacturing Company's Works, Short Electric Manufacturing Company, and lunch at the latter place will recall pleasant memories. The banquet at the Hollenden Hotel was fine, the speeches excellent, especially that of James H. Hoyt.

The Atlanta convention I was unable to attend. The faces at the later conventions are many of them new and unknown to some of us. Of course, the attendance both of railroad representatives as well as of supply men is much greater, there is more to see, and less time to see it in than in former years, but I am inclined to think that each year the conventions and exhibits are more valuable than the preceding.

I hope they will continue to grow in interest.

F. B. BROWNELL.

Brownell Car Company, St. Louis.



VICTORIA RINK—MONTREAL.

FROM ST. LOUIS TO MONTREAL.

When my little ones climb to my knees at "Children's Hour" and ask for a story of what I did when I was a boy, their wish meets with instant response, for garrulous age is pleased with an opportunity to live over in memory the olden days. Still, such an indulgence fails not to remind me that I am growing old, a reflection not altogether pleasant. A review of the past impresses me strongly with a sense of how little I have accomplished, and makes me wish for further time in which to master theoretically and practically, more of the facts and work that will make for the success of the interests I have in charge. I am affected somewhat after the same fashion, by your request to write a little about the past days of our association. You, doubtless, desire to be complimentary in your invitation, and I thank you for this, as for many other tokens of your kindness, but, when I look back on the past ten years of the street railway business and its American Association, I cannot repress the feeling that I am a sort of relic of the past regime, possibly, "out of date" in these "piping times" of electricity and cables.

Then, too, I cannot speak of the days when the horse was abroad with his 16 feet, 30 inch wheel, trailer; and the horse-car was courting custom along the streets at the rate of six miles per hour, without betraying my affection for that antiquated style of railroading, and this gives confirmation to the sentiment that I am more of the past than of the present.

What a veritable revolution has taken place in our business in the last decade. We "old dogs" have had to learn new tricks with a speed that has put to the test all our adaptive and imitative skill. We have been obliged to acquire a new nomenclature and to fashion our tongues to a speech that aforetime was hardly to be heard outside of the laboratory, class-room or engineer's sanctum.

With the going out of the barn and horse, and the incoming of the power-house and machine shop, the displacement of the veterinary by the electrician and engineer, and the horse-car driver by the motorman, a re-adjustment of ourselves to new conditions, to the use of new tools and contrivances has been compulsory, and we have been obliged to absorb such a multitude of new facts, ideas and conclusions, within a few years, as to put our mental digestion to the severest test.

In point of time, the change, as I have stated, required but a few years but the new differs so much from the old that the latter in retrospect seems far away. I fancy than any one who would have been bold enough to have outlined in prophesy ten years ago, what changes in our methods and habits of business would be necessary in 1895, would have been laughed at as a dreamer and a weaver of fantasies.

It was just ten years ago that our association met for its annual session in St. Louis. I well remember that meeting. It was the first convention of the association I had attended as a delegate, although I had kept myself informed of the work of the organization by reading its

proceedings up to that date. Boston, Chicago and New York, had welcomed the representatives of the street railway industry and St. Louis was their entertainer on the occasion of their fourth annual gathering.

I recall that as I entered the association room on that October morning, the first person to attract my attention was a round faced, chubby looking man, who beamed with good humor and who, seated on a front seat (it is always his habit to get in front) was telling a good story to a number of enjoying listeners. The story teller was Tom Johnson, whose genial face and oracular utterances, we have missed of late from our conventions.

The president, who graced the chair at the meeting, was one whom we all remember as an eloquent gentleman, of great parliamentary skill, whom we have rarely seen equalled, never excelled by any one of those who have been honored by our election. I refer to Calvin A. Richards, of Boston. I recall being especially impressed with his opening address, and later, during the convention, when he described to us the work of the school for conductors and drivers he had established in Boston in connection with the West End Company, his new and original ideas, elicited hearty applause. Many times afterwards in convention and at the banquet board, I was privileged to listen to Mr. Richards and always with delight and profit, but, upon no occasion more so than when in Philadelphia in '87, he made a most eloquent appeal for a more careful consideration of electricity as a motive power for street-cars, a subject which, at that time, was being treated somewhat cavalierly and as rather a dream of the inventive enthusiast unworthy the sober thought or investigation of practical street railroad men.

Another polished speaker at St. Louis, whose face we no longer see at our gatherings, was William White of New York, at that time president of Dry Dock, East Broadway & Battery Railway Company. The question at issue was "The Admission of the Reporters of the Local Press," and Mr. White was especially interested in the subject. While we were somewhat at odds touching the matter, we were all one in our appreciation of the clear-cut and graceful manner in which Mr. White voiced his ideas.

Another feature of the session to me, was my meeting with and listening to John B. Parsons, then of Philadelphia now of Chicago; he earnestly urged the selection of the higher grade of men for our employment. Mr. Parsons spoke of the attempt to foist upon the companies, for employment as conductors and drivers, the friends of ward politicians whose only claim for such appointment was that they might be of political use to the companies.

The St. Louis meeting was a notable one, but, in fact, so have been all our gatherings. However, the meeting of that year, and the two or three that succeeded it, stand at the parting of the ways that marked the beginning of the change of our business from old methods of traction to new. Holmes, of Chicago, was making his gigantic cable experiment in that city; and in Richmond, electricity was soon to be put to the test. Those early meetings

in the formative period of the association were constructive and accumulative, bringing together, as they did, for the first time representatives of companies from all parts of the country. They were destructive of the insularity that we had each insisted upon in our own particular and chosen domain. They led to confidence in each other, and made way for the entrance of that spirit of unified intelligence in what may be termed "science of street railroading" that begat a willingness to trust experiment and test made by one another. The rapid development and improvement of our work as railway men in latter years is, in my opinion, largely due to the influence of the meetings and the discussions held, at the period of which I speak, but, I am writing at too great length and must break off here my reminiscences.

Pleasant as is this look backward, I am saddened to remember how many of my fellow-workers, whose kindly smile of greeting and hearty hand-clasp I used to look forward to with pleasant anticipation as I journeyed yearly to the conventions, I miss now-a-days. Death has claimed for his own many whose presence at each of our annual gatherings, contributed so much to their pleasure and interest: Hazzard, of Brooklyn; Ackley, of Philadelphia; Richards, of Boston; Jones, of Troy and William Richardson, of Brooklyn, with not a few others, have gone to join the great majority. Others of our list of former co-laborers have dropped out of the ranks of active workers in the association and come, either not at all, or at infrequent intervals to our meetings.

Woodworth, of Rochester, Watson, of Buffalo, Clem-inshaw, of Troy, Kerper, of Cincinnati, Monks, of Boston, Eppley, of Orange, Spaulding, of Buffalo, White, of New York, Walsh, of St. Louis, Lewis, of Brooklyn, Holmes, of Chicago, Clegg, of Dayton, fail to answer to their names at roll-call. New men from all quarters of the country have come in and our ranks are full, but I cannot forget those who have aforetime been my comrades. Most of all, when I take my place as delegate at Montreal, will I miss that one who for so many years carried the heat and burden of the association work,—that one upon whom we have all relied so much to make

smooth and plain the detail and method of our yearly conventions and who never wavered at his post or shirked a duty; who was for so many years our much loved and honored secretary, William J. Richardson, of Brooklyn. A christian gentleman of rare courtesy in spirit and breeding, his unflagging zeal, his heart-whole friendship and exceptional character, made for him a place in our hearts which will never be filled and his death will ever be regretted by me as a personal loss.

C. D. WYMAN.

Milwaukee Street Railway.

A MEXICAN PLEASURE RESORT.

BY C. L. JOHNSON, MECHANICAL ENGINEER, COMPANIA DE TRANVIAS DE MERIDA, YUCATAN, MEXICO.

In a recent issue of the STREET RAILWAY REVIEW I saw an invitation to street railway men to contribute

photographs of parks and summer resorts owned by street railways.

Agreeable to the request I have endeavored to obtain some photographs of the "Recreos de Itzimna" (Itzimna Pleasure Grounds.) Perhaps it will be interesting to your readers to know that street railway summer resorts are also being introduced in foreign countries. In order to take advantage of the light I had to take the photographs early in the



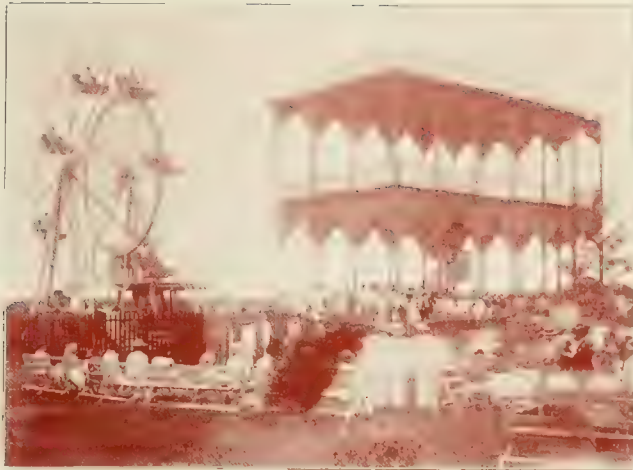
N. ESCALANTE Y PLON.

evening, before the regular hours, so that only the villagers were around and that is why the regular attendance is not shown in the views.

The "Compania de Tranvias de Merida" in the year 1892 started up a small pleasure ground in the picturesque little town of Itzimna to which one of its lines runs.



MEXICAN STREET RAILWAY PLEASURE RESORT—TERMINAL ARRANGEMENTS.



AERIAL SWING AND CENTER PAVILION.

The town is three miles distant from Merida, capital of the state of Yucatan, Mexico. A razzle-dazzle, cane racks, hand ball targets and other such attractions were set up. It was quite a novelty for the people who went to the new grounds by thousands every evening. On Sundays the crowd was so large that the gates had to be closed for a time. In view of this great success the company decided to conduct the enterprise on a larger scale and bought a very extensive lot in the same town, comprising about 10 acres of beautiful land, with orange trees, palm-trees and other tropical plants. Work was immediately begun to turn the grounds into an attractive park and pleasure-ground. A large and attractive American carrousel was imported and set up. Also an aerial swing with steam power, razzle-dazzles, which is a game liked very much by the natives, and lots of other games, etc., were put up. A complete electric light plant was ordered from the United States. A Chicago electrician was engaged to put up the plant which was accomplished within a few weeks. Incandescent lamps were placed every where. A large number of them were tastefully arranged in the foliage of large trees, around which solid masonry benches were constructed, to add to the seating capacity of the place. By the 7th of May, 1893, the place was veritably converted into a magnificent park and pleasure-grounds such as cannot be found anywhere else in the Republic of Mexico. On that date it was solemnly inaugurated, the governor of the state having opened the gates for the first time to the public. The mayor of the city, members of the board of aldermen and other officials of the government and leading business men also attended. The park was officially named "Recreos de Itzimna."

At first admission to the park was free, but after the people had got used to go, a fee of five cents was charged for admission and free seats were given to the patrons in every place within. An orchestra plays every evening and from time to time entertainments are given in a special hall provided for that purpose. Occasionally one of the military bands is hired to play in the park.

A large piece of ground at the back of the park is

devoted to miniature railroad tracks for velocipedes. The gage is 19 $\frac{3}{4}$ inches and there is a large number of railroad velocipedes of the same shape as those used by the railways for running over the line. They are worked by both hands and feet and riding one of them is a magnificent and healthful exercise. This is the best paying game in the park; it is very much liked by the people, especially the young men who are allowed to take their lady friends on the back seats. There are velocipedes for one, two or four persons. After the gates are opened in the evening until closing hour, the velocipedes are never unoccupied. The crowd that is waiting at the track gates is so large sometimes that policemen have to be called to preserve order.

The park is patronized by the best people as well as by the middle class. On Sundays and special days all the cars available are put on the line and often they are not sufficient to carry all the people that want to go. One of the principal attractions this summer was the "Rifas Gratis." A numbered ticket was handed every person on entering the park. At a certain hour as many numbered balls as tickets given away were placed inside a large globe. In another small globe one hundred balls numbered from 1 to 100 were placed. A boy then drew out one of the balls in the large globe and read aloud the number on it, say for example 1234. The person having that number in his ticket then presented it and the boy took out one of the balls in the small globe reading out the number which we will suppose to be 26. One hundred prizes were placed in sight on a large table all numbered from 1 to 100. Then that person having presented ticket 1234 was entitled to prize No. 26, which was immediately handed over to him. The prizes consisted of sundry articles of utility, such as small bags of flour, rice or corn, sugar cured hams, canned goods, preserves, toys, chickens and young pigs alive, etc. This sort of thing proved to be very attractive and profitable for the company. It was given in those days when no crowds were expected, such as Monday, which was generally dull and it turned out to a good means of having a large



ONE OF THE PROMENADES.

attendance when otherwise there would have been none

Referring to the views you will notice that some of the cars are drawn by one, others two mules; that just outside the entrance gate are tables loaded with refreshments and wine. In another scene is shown the cathedral directly opposite the main entrance to the park.

By the aid of the park, the Itzimna line, which was not a very profitable one, has turned out to be the best paying of all the lines. Thus it is seen that park attractions produce revenue not only in the United States, but in other countries where they are carried out properly.

The idea of the park was originated by N. Escalante y Peon, general manager of the company, and the whole charge of directing the work from beginning to end was under his immediate supervision. Great credit is due to him for having succeeded in this enterprise, notwithstanding the many difficulties and disappointments that such kind of work has to surmount in Yucatan, where the resources at command are so scarce and skilled labor

POOR PRACTICE IN FINE PLANTS.

What the Inspector Saw While on His Vacation.

The night motor inspector on the Punkinville City Railway took a lay-off last week and spent several days looking over some of the big city plants. They are not very swift down at Punkinville, but they read the *STREET RAILWAY REVIEW* and keep abreast of the times, and if their apparatus is not up to the times it is because of the want of the wherewithal to buy more, and not because they don't know any better. The inspector had been reading for some time of the wonderful roads and the magnificent equipments going in up at the big city, and as soon as he got a chance he went up to see them and learn what he could. The power plants interested him, but the great attractions to him were, of course, the repair shops and car barns. He was anxious to get pointers on the little things pertaining to his daily work. The 2,000-



MEXICAN STREET RAILWAY PLEASURE RESORT ENTRANCE.

is not easily found. Mr. Escalante y Peon is only 28 years old. He is a Yucatecan by birth but he has English blood on his father's side and Spanish on his mother's. He is a graduate of Manhattan College, N. Y., and his ideas and business methods are entirely American. He is a great lover and admirer of everything that is American, and he declares frankly that his best, most agreeable and profitable time is that which he spends annually in the United States.

SEPTEMBER AND OCTOBER.

The finest shooting grounds in the Northwest are on and tributary to the lines of the Chicago, Milwaukee & St. Paul Railway. The crop of prairie chickens promises to be exceptionally good this year; also ducks and geese. In Northern Wisconsin and the Peninsula of Michigan splendid deer shooting is to be had.

The game laws will be changed in several of the Western States this year.

Full information furnished free. Address F. A. Miller, Assistant General Passenger Agent, Chicago, Ill.

horse-power direct connected engines he could not appreciate but there were some beautiful points about the shop practice that he got down in in his notebook and in his memory, and which are likely to remain there. Here are some of the notes he got on "one of the finest electric roads in the country."

"Big shops—500 volt lamp circuits running everywhere in big mess—No switches on lamp circuits—When lamp burns out steal one from another circuit—Unscrewing bulb with current on burns out sockets by dozens—When socket supply runs low men try to blow out arc when unscrewing lamps—Otherwise let her rip—Takes one's one man's time to tinker up lamp circuits—Found good way to light torches—Take lamp out of socket, stick end of a bolt in socket and draw arc to light piece paper—then light torch—This is good for sockets—Sockets are plenty and company is rich—Anything goes in way of car-wiring—Every man inspects his own work—When cars come back to be rewired it gives wiremen some more work they wouldn't have otherwise—Track bonding done several

weeks after holes are drilled—Nice coat iron rust to insulate between bond and rail—Three piece bonds used—Big drop in return circuit—But anything goes where the money is plenty—Selah.

WHAT NEXT IN THE PATENT LINE?

Verily, it seems as if sometimes a patent is granted on "anything to anybody" who has nerve enough to apply for it. On May 7, 1895, a patent was granted to Richard Watkins, of Sacramento on, a method of "preventing electrolysis of street pipes." The application was made June 25, 1894. Now this method is nothing more or less than the indiscriminate connection of rails and pipes at various points over the system. The first claim of the patent is for:—

"The method herein described of preventing electrolysis of metal street pipes located adjacent to electric railways, which consists in connecting the said pipes with the return conductor proper by means of metallic conductors, and also connecting said pipes with the generator forming a part of the electric circuit, whereby the said pipes receive and conduct the surplus electricity which would otherwise indirectly charge the earth adjacent to or surrounding the pipes, thereby preventing electrolytic action, as specified."

Now connecting the water pipes to various points on an electric railway return has been practiced to some extent ever since the first roads were built, through not always with a view of preventing electrolysis. At Milwaukee however it was extensively tried for at least one year before this patent was applied for, and an account of the work was published in the STREET RAILWAY REVIEW for December 1893, in an article by O. M. Rau, electrician of the Milwaukee Street Railway, over six months before the patent was applied for. Very likely the inventor believed the method to be new but it certainly seems as if the attorneys and patent office examiners should know enough of the state of the art so that they would not help a man to get a patent of such doubtful validity. The final decision as to the validity of a patent rests with the courts. When a patent is issued it simply means that the examiners believe it to be new as far as they can determine and the man to whom it is issued has reason to think that it is of some value and stands a good chance of being sustained by the courts should it ever get there. When however the examiners grant such patents as the one just mentioned, the inventor has no assurance that his patent would be worth anything if it ever got into court. The patent office examination

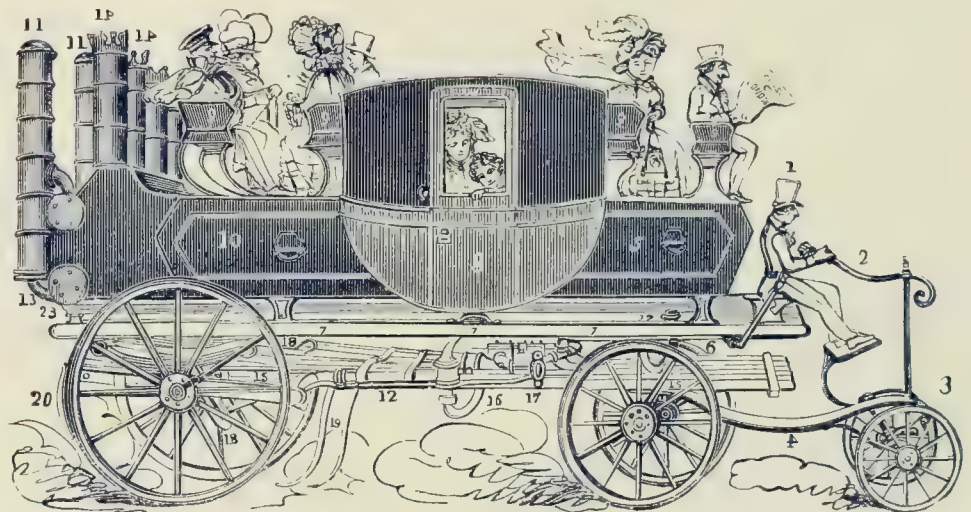
is for the protection of inventors and it should protect better than this.

STEAM VEHICLE OF 1827.

One of the numerous steam carriages that traveled the common roads of England early in the present century is represented in the accompanying engravings. It was the invention of Mr. Gurney, a scientific gentleman of wealth, who expended in its design and construction much mental effort and considerable coin of the realm.

The carriage would carry 6 inside and 15 outside passengers. The body was supported by springs resting on a longitudinal frame of heavy timbers which in turn rested directly on the axles. To the end of the tongue was attached a pair of wheels by which to steer.

The boiler was of the water tube type, consisting of 40 wrought iron pipes bent in \sqsubset shape and connected below to a mud drum and above to a steam drum, the



STEAM VEHICLE OF 1827.

two lying parallel one directly above the other. The steam was freed from entrained water by means of the 2 separators at the rear end of the vehicle. Next to the separators were 4 chimney stacks. An hour's supply of feed water, 60 gallons, was carried in a shallow tank extending the length of the body.

Power was developed by 2 double acting horizontal steam cylinders having their connecting rods joined to the axle of the 2 rear wheels by 2 cranks set at 90 degrees. A throttle-valve controlled the steam pressure and the valve gear effected the reversing.

A peculiarity is the 2 "propellers, which, as the carriage ascends a hill, are set in motion, and move like the hind legs of a horse, catching the ground and then forcing the machine forward, increasing the rapidity of its motion and assisting the steam power."

Receiver B. D. Slaughter, of the Lincoln Street Railway Company, Lincoln, Neb., has been maintaining an excellent service to Burlington Beach. Except when there were special attractions no admission was charged.



At the meeting of the American Street Railway Association the coming month some action ought to be taken with reference to the discussion at least, if not the organization of an association, or the adoption of some plan that will bring the claim agents of the street railways into a closer relationship. The realization of such a movement will increase the efficiency of this important department, which has such a large part in saving money for the stockholders. The claim agents themselves feel the need of some means of increasing their facilities, but there has been no one to start the movement. It is true that the adjusters of the large companies keep in touch with each other, whenever they require particular information. As far as it goes this is an excellent practice, but because there is no systematic method of imparting information, at regular intervals, many important facts are permitted to escape.

It is safe to say that hundreds of cases of frauds receive money from street railways every year, for no matter how vigilant an adjuster may be, or how strongly he believes that a claimant is not entitled to money, in the absence of any positive proof that other roads have been worked by the same party, he is forced to make some settlement. Although the amounts paid in such cases are small, they aggregate a large amount of money in five years.

It was not until the Freemans had defrauded several companies, that their record was discovered. Owing to a piece of carelessness which the quick discernment of Thomas H. McLean, general manager of the Citizen's Railroad Company, Indianapolis, noticed and followed up the attempt of Joe Stein and Barney Ginsberg to defraud the company was discovered. When he thought there was something wrong Mr. McLean looked up the men, and found that they had defrauded other street railway companies on similar fraudulent claims. Had there been a system of reports regularly sent out, Mr. McLean would have discovered the attempt to defraud sooner.

Had there been such a system it would not have been necessary for Mason B. Starring, claim agent of the Chicago City Railway Company, to send out a request last April for information concerning Isaac Siff and David Semanski.

These are only a few incidents which serve to show the value of a closer relationship between claim agents. The cost would not be much, and would be more than covered by the escape from fraudulent claims. Never was there a better time than the present meeting of the American Street Railway Association for a full discussion of such an organization, which could easily be made

a part of the association work. The small roads would receive as much benefit in such a plan as the large ones.

* * *

In the August REVIEW was a reproduction of the conductor's accident report blank, designed by W. F. Kelley, general superintendent of the Columbus Street Railway Company, Columbus, Ohio. It will be remembered that Mr. Kelley, in order to secure good intelligent reports of accidents from the conductors, offered prizes for six

The Columbus Street Railway Co.

COLUMBUS, O., *June 20, 1895*

Superintendent of Transportation:

An accident occurred in connection with my car this day, circumstances of which are as follows:

Name of Conductor *H. C. Banks*
 Name and Number of Motorman *J. B. Rutledge*
 No. of Car *206* Direction going *East*
 Time of Accident *6:05* A. M. P. M.
 Where Accident occurred *Between Hards and Dorn Streets on Fulton*
 Name of Person Injured *Albert Henderson*
 Residence *West Liberty St.*
 Employee or Passenger *Passenger*
 Kind of Injury *Dr. Lippincott's report: Slight bruise on left side of head*
 Kind of Vehicle Damaged *bruise on left side of head*
 Amount Damaged *behind his ear - no serious injury*
 Residence _____
 Extent of Damage _____
 Damage to Car _____

WITNESSES.

Name <i>H. Fisher</i>	Residence <i>13 5th St.</i>
<i>Alice Swan</i>	<i>327 North Ave.</i>
<i>E. Ferguson</i>	<i>49 Walton St.</i>
<i>G. H. Marsh</i>	<i>16 Market</i>
<i>Mrs. Walters</i>	<i>341 Noble</i>
<i>Mrs. Vaughan</i>	<i>220 West Ave.</i>
<i>Geo. McIlwain</i>	<i>146 Eaton St.</i>
<i>Mary Lynn</i>	<i>98 Lombard St.</i>
<i>August List</i>	<i>154 Elmer Ave.</i>
<i>H. C. Banks</i> Conductor.	<i>Eaton Street Line.</i>

When an accident occurs, make a report at once, giving name and residence of each witness, and write full particulars of accident on back of this report

Conductors neglecting to procure Names of Witnesses will be Suspended until such Names are furnished.

MODEL ACCIDENT REPORT.

months, and the offer has been renewed. The model blank shown in this issue is the one which took the first prize. The names are fictitious, but the remainder of the

report is a true copy. On the reverse of the blank is space for a statement in full of the circumstances witnessed or learned by the conductor at the time. Conductor Banks wrote, "I would judge this boy to be about 12 years old. He wanted to get off at Ward street. He did not wait for the car to stop, but jumped off about 50 feet west of Ward street alighting on his left foot, and then falling on his left side, striking his head on the street paving. When I got to him he was unconscious and I took him to Dr. Lippincott's office and had his wounds examined. I give the result of the doctor's examination on the other side of this report. No one seemed to know the boy's residence number. He goes to school at the Riserschool on West Noble street. The boy had been warned against jumping by one of my passengers. There were thirty-five of the boy's school-mates with him. They range in age from 7 to 10 years, and I can secure their names at the school."

CROWDED STREET CARS.

C. L. Bonney, vice-president of the Chicago General Railway Company, during his recent trip to London, was struck with the practice in vogue over there, prohibiting anyone to ride on a street car, unless there was a seat for him. Mr. Bonney was interviewed by the newspapers upon his return, when he announced that he would endeavor to bring about a similar practice on all the lines in Chicago. The majority of daily newspapers that have commented upon Mr. Bonney's scheme, thought it should be adopted at once in every American city, apparently forgetting the fact that the United States is not Europe. It is refreshing to find a daily paper that can look below the surface. The Harrisburg, Pa., Patriot says, editorially:

"The president of a Chicago street railway has made himself temporarily famous by proposing an ordinance requiring street railway companies to provide a seat for every passenger they carry. This gentleman being abroad recently, noticed that all the passengers on the European lines were given seats and that this fact had no ill effect upon the dividends declared. He saw that the companies had no difficulty in providing seats and that they nevertheless did an enormous volume of business. He thinks the same thing could be done in Chicago.

"Perhaps it could, and yet his experiment will be watched with the greatest curiosity and interest. The conditions which prevail in Europe are not at all like those which obtain here. There nobody is in a hurry; nobody needs to be. Here everybody is on the move; heels have no time to cool while millions of brains are devising incursions into the domain of business. Here every man, woman and child wants to get there as quickly as possible, and not when most convenient, as abroad. The American has not the patience nor the stolidity to wait for the coming of what he can seize.

"The idea of the Chicago man is almost foredoomed to

unfruitfulness. Generally speaking, his patrons get on his crowded car because they will not wait for the next one, which indeed may also be crowded. He wants to go somewhere, he wishes to take a car that his getting there may be expedited; the fact that there are no vacant seats on the conveyance presents an inconvenience of light consequence in comparison with the unbearable misfortune of sacrificing valuable time in walking to his destination or waiting for another car which may perchance also be crowded. He won't wait; he will take the first car even though he must hang on with fingers and toes and jaws, to the end of the platform. And the minute he decides to do this he begins to abuse the company for not furnishing adequate accommodations, forgetting that he voluntarily crowded himself into his uncomfortable and somewhat hazardous position.

"It is quite likely that if the proposed ordinance be adopted and put in operation, the first day cars with seats filled roll majestically past the men who want to ride and who observe no passengers clustered at the end of straps or upon the platform, there will be such a howl of indignation as will raise the roof off the mouth of the Chicago river."

NOVEL ADVERTISING DEVICE.

Herewith is illustrated a device for utilizing the trolley pole as an advertising medium. The contrivance consists of two thin tin boxes 33 inches long by 15 inches wide, so arranged that they will be horizontal at all times with space between wide enough to hold four long incan-



TROLLEY POLE ADVERTISING DEVICE

descent lamps. The advertisement is painted on a sort of curtain with black background and white letters, or white background and black letters. By the use of lamps the sign is as effective at night as in the daytime. The device is the invention of Edkins & Bossett, Utica, N. Y.

For trying to ride on a plugged street car ticket a Detroit policeman was fined \$400 in reduction of pay.

THE WINTERS BRAKE.

In view of the long and successful use of friction brakes on cable roads it seems strange that more attention has not been paid to their application to electric cars. Nevertheless until the last year very little has been done along this line. One of the great difficulties has been the room taken up on the axle. With some motors there is very little room left for a brake. The problem has now been worked out however and one of the most thoroughly tried and successful is the brake described here. It is the invention of D. L. Winters formerly with the Pueblo City Railway but who is now giving his attention to the introduction of the brake on the electric roads of the country. Like other friction brakes it makes use of the energy of the car to draw up the ordinary brake. The friction mechanism has the same function as the brake cylinder on an air brake. The accompanying engraving shows it as applied on a McGuire truck but it can be applied on any truck with very little change in the ordinary brake. The heavy lines show the Win-

simple, it occupies but $5\frac{1}{2}$ inches on the axle and requires practically no care until it is worn out, when it can be renewed at nominal expense. All these are points that will be appreciated by companies about to equip with something better than manual brakes. It has been used by the Pueblo City Railway since May 1894, was patented last January and has recently been given a three months trial on the South Chicago City Railway. As a result arrangements have been made to equip all the cars of the latter road.

FENDERS IN 1860.

Fenders were thought out and patented long before the operation of electric railways caused some thousand of inventors to think they had found the only fender to supply a long felt want. The patent office records show a patent for a fender that was issued in 1860. The guard was a pair of netting covered tilting frames pivoted at each end to notched levers, capable of being operated from the car platforms; the guard protected the sides of the wheels longitudinally of the car and at the same time



ters brake attachments as distinguished from the rest of the truck. On one of the car wheels is a smooth friction disk which is either bolted on or cast as a part of the wheel. Against this the combination disk and winding drum is made to press, thereby winding up the chain and applying the brakes. The application of the brake is made by a system of levers connecting with the ordinary brake staff chain and is plainly shown. The friction disk is a simple iron forging and as the friction contact is entirely between flat iron surfaces there is no sticking and jerking. The winding drum supporting the friction disk is lined with babbitt metal and has an oil cup to save wear on brake and axle. The pressure is applied to the disk by a forked lever fitting in a groove in the drum. Connections may be made with trailers in the manner indicated or any other desired way. As said before, the motorman applies the brake with the ordinary handle. If desired the brake can be adjusted so that an emergency stop can be made with the pressure of one finger. The advantage of a quick action brake does not need to be enlarged upon here. The advantages of this particular form of brake are that it is very cheap and

extended past and in front of them in a curved or plow-shaped form across the track rails, the point or extreme forward portion running close to the track, or at a distance from it, as desired. At the end of a trip the driver had simply to elevate the corresponding end of the guard by means of its lever; he then proceeded to the front platform and dropped that portion of the guard the desired distance. In this device the guard is not extended beyond the dash-board; it was not detachable, therefore, in shifting it it was not necessary to carry it from one end of the car to the other; its arrangement being such as to prevent a person from falling between the wheels or in front of them.

In place of an intramural railway, Martin F. Amorous, a director, has constructed at the Atlanta Exposition a roadway of 2-inch plank 18 feet wide, over which herdics carrying 18 passengers will be drawn by horses. The fare for the round trip, occupying 30 minutes, with stops at all the prominent buildings, is 5 cents. The project to build the intramural railway was abandoned, it is said, on account of the numerous grade crossings.

STREET RAILWAY LAW.

EDITED BY FRANK HUMBOLDT CLARK, ATTORNEY AT LAW, CHICAGO.

Electric Railways on Country Roads.

Electric railways over country roads, connecting widely separated cities and towns, cannot be built without consent of the owners of the fee of such roads, under the General Street Railway Act of Pennsylvania.

An electric railway imposes an additional servitude on the land over which public roads run outside of municipal boundaries.

A street railway company has no right to build any part of its line until it has the right to complete it, where it has no power of eminent domain.

The Court said in part: "From these provisions, we think it is apparent that the attempt now being made to convert these city conveniences into long lines of transportation, connecting widely separated cities and towns by electric railways traversing country roads, was not anticipated or provided for by the legislature. The failure to confer upon these companies the power of eminent domain would, if it stood alone, be sufficient to justify this conclusion. The land taken for streets in cities and boroughs is in the exclusive possession of the municipality, which may use the footway as well as the cartway for any urban servitude without further compensation to the lot owners. (*Provost, Jr. v. New Chester Water Co.*, 162 Pa. 275; *Reading v. Davis*, 153 Pa. 360; *McDevitt v. People's Nat. Gas Co.* 160 Pa. 367.) Nor does the construction of a street passenger railway upon the surface of the street impose any additional servitude upon the property fronting on the streets so occupied. (*Rafferty v. Central Traction Co.* 147 Pa. 579.) But the easement required by the public by proceedings under the road laws is an easement for passage only. The owner is entitled to the possession of his land for all other purposes. We held, therefore, in *Sterling's App.*, 111 Pa. 35, 56 Am. Rep. 246, that the occupancy of a country road by a pipe line imposed an additional servitude upon the farm owner, while in *McDevitt v. People's Nat. Gas Co.*, supra, we held that a pipe line laid within the limits of the street by authority of the city did not impose any additional servitude on the lot owner. The reason for the distinction is fully stated in the opinion in the latter case. The same distinction exists, and for the same reasons, between urban and suburban property, as to the right of corporations to occupy a highway for a street passenger railway. This, as will be seen by the cases cited above, is an urban servitude, to which suburban property has not been subjected by law, up to this time. The consent of township authorities justifies an entry upon the public road, so far as the public is concerned; but the supervisors of the townships have no power to bind private property, or subject it to a servitude, for the benefit of any person or corporation, other than the township and the public it represents. The carriage of passengers through the township, on their journey from one city or borough to another, by rail, is in no sense a township purpose; and whether these passengers make their journey in cars drawn by a locomotive over a steam railroad, or in those propelled by

electricity over tracks laid upon the highways, is immaterial both to taxpayers and to landowners along the route traveled, except as the adoption of one or the other of these modes of transportation may affect the township roads, or the private property of citizens. * * * *

"The only remaining question raised in this case is over the right of a street railway to build any part of its line before it has the right to complete it. A steam railroad may enter upon any part of its line and commence building, subject only to its duty to complete the line in accordance with its charter. The reason of this is that it is clothed with the power of eminent domain, and may enter and appropriate land regardless of the will of the owner. A street railway company, as we have seen, does not possess the power of eminent domain. It cannot build under its charter alone. It must have the consent of the proper municipal or local authorities, or it cannot move. If the proposed line passes through a city, borough, or township intermediate the termini, and that city, borough, or township refuses its permission, the power to build the road described in the application and charter cannot be exercised. It must be possible for the company to complete its line before it has a right, as against any city, borough, or township into which its line extends, to begin work. It is not possible for such company to complete its line without the consent of the local authorities of the districts through which it passes; and, where this is refused in one or more of the municipal or quasi municipal divisions through which its line runs, the building of its proposed road under its charter is an impossibility. Let us suppose, for purposes of illustration, a charter to authorize the construction of a street railway from A., through certain roads in B., C., and D., to the city of E., and that consent has been obtained from the local authorities of A., and C., and of E., but refused by the local authorities of B. and D. The proposed line is thereby cut up into three wholly unconnected pieces. It is very clear, that, under a charter authorizing the building of a line of road from A. to E., the company could not lawfully build three distinct local roads, viz. one in A., another in C., and the third in E. The consent given by A. to the construction of the line of road authorized by the charter would not estop the local authorities from objecting to the construction of a local road within its own limits. When confronted with its own consent, A. could well reply, "The road to which consent was given is not the road you are now building, for the building of that road has become impossible by the action of the authorities of B. and D."

(Supreme Court of Pennsylvania. *Pennsylvania Railroad vs. Montgomery County Passenger Railroad Co.* 27 Lawyers' Reports Annotated 766.)

[The rule is, that a street railway is not an additional burden upon a city street; and this has been held to be the law, even where the railway carries freight as well as passengers. *Montgomery v. Santa Ana & Westminster R. Co.*, 5 Street Railway Review 217; 25 L. R. A. 654.

The foregoing Pennsylvania case distinguishes between city streets and country roads, and is new in this respect. For bill to enjoin the construction of a street railway in a country road see *Niemann v. Detroit Suburban Street Railway Co.*, 5 *Street Railway Review* 21.—ED.]

Attempt to Board Moving Car—Failure to Provide Safety Devices—Contributory Negligence.

One does not become a passenger of a street railway company by a mere attempt on his part to board a car while in motion, in the absence of an acceptance as such by the company, express or implied.

The failure of a street-car company to provide its cars with a safety device designed solely for the protection of passengers and employes is not available to one standing in neither of such relations.

It is not contributory negligence, as a matter of law, preventing recovery for death by being thrown under the car and run over, for a person to attempt to board a street car moving at a rate of not more than three or four miles an hour, though propelled by electric power, in the absence of disqualifications by reason of age, lack of physical development, and experience.

(Supreme Court of Missouri, *Schepers v. Union Depot Railroad Co.* 29 *Southwestern Reporter* 712.)

Damages for Wrongful Assault—Injury to Feelings.

Injury to the feelings, causing humiliation or mental suffering, may be considered in awarding damages for a wrongful assault and battery accompanied with circumstances of insult or indignity; but no allowance can be made for injury to the plaintiff's business or his professional reputation.

(Supreme Court of Wisconsin. *Schmitt vs. Milwaukee Street Railway Co.* 61 *Northwestern Reporter* 834.)

Rights of Street Cars and Travelers at Crossing—Neither Superior to the Other.

The respective rights of street cars and travelers crossing the track at intersecting streets must be exercised with due regard to the rights of each; and the right of neither is superior to that of the other.

(Supreme Court of Nebraska, *Omaha Street Railroad Co. vs. Cameron*, 61 *N. W. Rep.* 606.)

Rights in Highway—Injury to one Driving on Tracks.

A street railway has no such exclusive rights in the highway as to render one driving on its tracks a trespasser and per se guilty of contributory negligence if injured, provided he does not negligently remain thereon after notice of danger from a car.

(Supreme Court of Pennsylvania 166 *Pennsylvania State Reports* 66; 30 *Atlantic Reporter* 1048.)

Person Standing on Track—Duty of Motorman.

A motorman of an electric car does not discharge his full duty towards one whom he sees standing on the track, by giving the signals of approach, and he has no right to rely on the assumption that such person will get off the track, but it is his duty to run the car with care, give the signal, and use every precaution to avoid an accident.

(Supreme Courts of Civil Appeals of Texas. *Houston City Street Railway Co. vs. Woodlock* 29 *South Western Reporter* 817.)

WISDOM(?) FROM A MECHANICAL ENGINEER.

The predictions of the non-technical press as to the rapid extinction of the steam locomotive are in part counterbalanced by the ridiculous criticisms made on the electric locomotive by men calling themselves mechanical engineers, but who know nothing of what they are talking. The daily press is full of interviews with this kind of men on the subject of electric locomotives. Here is a specimen, the author of which we refrain from mentioning in the hope that he will learn better and repent before many years. In speaking of the electric locomotives in Baltimore he is quoted as saying: "A peculiarity of the electric locomotive lies in the fact that its tendency is to start its load with a sudden jerk. There is no gradual acceleration of speed but a bound forward as if the impulse were the result of an explosion. Such a motion will do for a light car, but when it comes to a ponderous mass of machinery weighing 90 tons and attached by compact couplings to a train of cars weighing 850 tons, the impossibility of starting such an enormous weight by a sudden impulse is apparent to any mechanic."

Now if the man knew anything whatever about electric motors he would know that one of the characteristics that distinguishes the action of an electric locomotive from a steam locomotive is the absence of jerk on the part of the electric locomotive. It is well known that a steam locomotive starts a load by a series of impulses or jerks, while the electric locomotive gives a steady pull. It is this steady pull of the electric motor which gives it an advantage in accelerating a train because it enables it to exert its full power all the time, while the steam locomotive can only give its full available drawbar pull at four points in each revolution of the drivers.

The gentleman was evidently not present at the test made in the Baltimore tunnel a few weeks ago in which an electric locomotive started a train of twenty-seven loaded cars and two dead steam locomotives (total weight 1,222 tons) on a grade of 42 feet to the mile and had it up to a speed of 10½ miles an hour in one minute. The rails were greasy. Not a very bad showing is it?

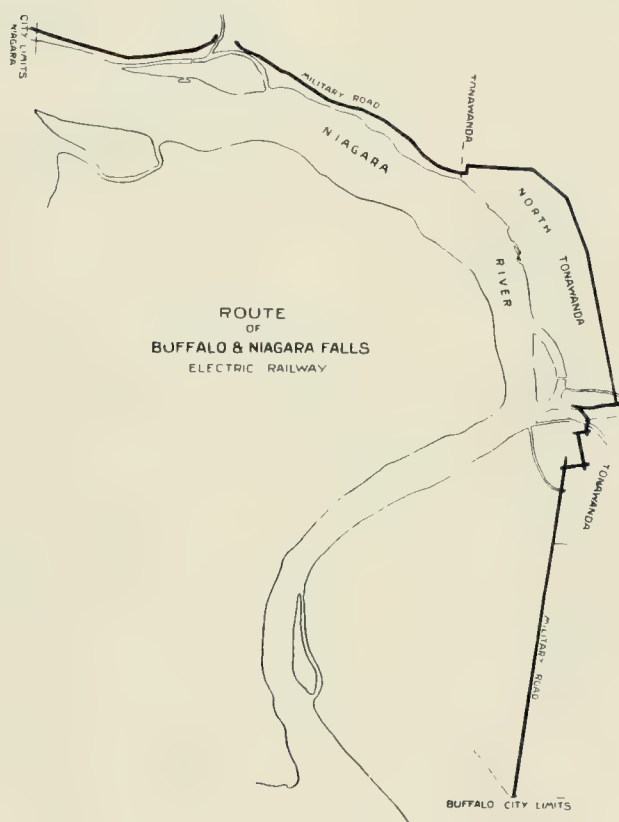
P. & B. IN EUROPE.

Among the many American electric railway supplies that are becoming popular abroad are the P. & B. insulating compounds. Owing to the increasing demand it has become necessary for the Standard Paint Company to establish headquarters in England. Agencies for the sale of P. & B. products will also be established in all the principal foreign cities of Europe. Ralph L. Shainwald, president of the Standard Paint Company, sailed from New York September 25, on the liner "St. Louis" and will spend two or three months abroad in connection with the new agencies.

BUFFALO & NIAGARA FALLS ELECTRIC RAILWAY.

Important Interurban Undertaking—Built for Heavy Traffic and High Speed.

When the White-Crosby Company within the present month finished the construction of the Niagara Falls & Buffalo Electric Railway it completed a piece of work that will by virtue of its substantial character, stand as a monument to its constructors for many years to come and which will probably be ridden over by a larger proportion of the people of the United States than any other electric interurban in existence. The Buffalo & Niagara Falls Electric Railway Company was formed and right of way was secured as far back as 1892 but the panic of



1893 delayed actual work until this spring. The chief promoter was Hon. W. Caryl Ely, ex-state senator, and now president of the road. The other officers are H. J. Pierce, vice-president, Burt Van Horn, Jr., general manager, and George H. Dunbar, secretary and treasurer. The corporation is on friendly terms with the local lines both at Buffalo and Niagara Falls as is shown by the fact that among its directors are H. M. Watson, H. H. Littell and Robert Fryer of the Buffalo Railway, and Captain C. B. Gaskill and Charles B. Hill of the Niagara Falls & Suspension Bridge Electric Railway. It goes without saying that this is of great value to the road, as it made possible the friendly traffic agreement with the roads at both ends, whereby the Buffalo & Niagara Falls cars run over the tracks of the Buffalo Railway to the heart of Buffalo and over the Niagara Falls & Suspen-



MOTOR CAR MOTOR ON EACH AXLE.

sion Bridge tracks to the center of Niagara Falls. More than this, transfers are given over the local lines at each end. The right of way was obtained by franchise from two incorporated towns and four townships or six authorities in all. As said before, these were obtained in 1892. President Ely "nursed" them and kept them alive during the three years that construction was delayed by the panic. The capital stock is \$1,200,000 and the authorized bonds \$750,000.

Early in the spring of 1895 the White-Crosby Company took the contract for building the entire road and turning it over complete to its owners. By the original contract the White-Crosby Company took \$625,000 worth of bonds and a large amount of stock. These bonds have nearly all been disposed of at par, except a few that will be retained by the company.

The line consists of 14.5 miles of double track, extending from the city limits of Buffalo to the city limits of Niagara Falls. The route over which cars will operate from the center of one city to the center of the other is twenty-three miles long. The traffic agreement with



INTERIOR 28-FOOT MOTOR CAR.

the Buffalo Railway is for fifty years and thirty-five years on the Niagara Falls & Suspension Bridge Railway. The greater part of the right of way is along the highway.



1. TRACK CONSTRUCTION.

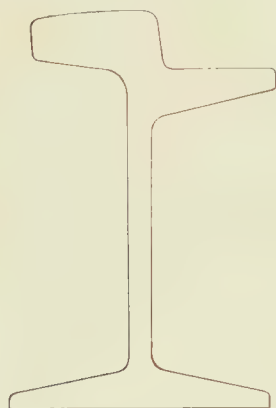
2. TRACK FINISHED ALONG HIGHWAY.

3. CONSTRUCTION TRAIN.

The contract for rails was let by the White-Crosby Company to the Cambria Iron Works for a 7-inch, very narrow lip 73-pound girder rail. It approaches a T rail about as near as a girder rail can. As little metal is lost in the tram as possible. Rails are rolled in 60-foot lengths, this being one of the first electric roads in the country to adopt the long rail. The joints have 8 bolt angle bars 3 feet long. Two 000 Chicago bonds are put in the base at each joint. Ties are the regular steam railroad form 8 feet long, 9-inch face and 6 inches thick. Rails are spiked direct to ties except that every third tie

a combination tie plate and rail brace is put in. Ties are laid 2 feet between centers. The entire length of the road is ballasted with sandstone or limestone. The plan is to put five inches of rock under the ties and then to fill in rock nearly even with the top of the rails making a total depth of eighteen inches. It will give some idea of the amount of ballast on this road, when it is stated that for several weeks the White-Crosby Company,

rary steam plant at Tonawanda. The north part is to be run from the great plant of the Niagara Falls Power Company at the falls. Ultimately the whole road as well as the local electric road at Niagara is to be run from the big water power plant. The only reason that the entire road is not run from Niagara is that the transmission line from Niagara Falls to Buffalo is not yet built. It is only a question of a few years until this is done and the steam plant abandoned. The current generated by the 5,000-horse-power generators in the Niagara Falls Power Company's plant is a two-phase alternating current of 2000-volts. To convert this into a direct current at 500 volts, it is transformed down by two stationary transformers, to such a pressure that when fed into a rotary transformer it will yield 500 volts at the direct current end of that transformer. The Westinghouse Company is building for the Niagara Falls Power Company, two



RAIL SECTION.

was receiving seventy-five car loads or 1,800 tons of stone per day, and the freight bills for stone alone amounted to \$1,000 per day. All the crushers in that part of the country were at work on the supply, and six quarries were being drawn on. Over 80,000 cubic yards of stone were used at a cost, including hauling, of \$125,000.

The overhead work is carried on octagonal pine and cedar poles, painted black at the bottom and white at the top. Forty miles of 0000 feed wire is used, partly furnished by Washburn & Moen and John A. Roebling's Sons. The line is sectioned into a few long sections.

The south part of the line is to be run from a tempo-



ROTARY TRANSFORMER.

500-kilowatt rotary transformers for supplying electric railways in the vicinity of its power house. These rotary transformers are not greatly different from a direct current generator in which at four equi-distant points around the commutator a lead is taken off and connected to a collector ring on the alternating current end. At one end of the armature are the four rings that take the two phase alternating current. At the other end is the ordinary



CAR BARN.

direct current commutator. These machines are self-starting and self exciting.

The electric car equipment has several new features. The motor cars all have four G. E. 800 motors. The equipment is made heavy to make high speed and climb three heavy grades. The controlling arrangement is something that is tried for the first time on this road. When running through the country and high speed is

as it would be a very difficult job to stop these heavy four-motor cars with trailers, without something of this kind. The motor cars seat 40 people. Besides the 20 motor cars there are 10 twelve seat open trailers, seating 60 people and mounted on double trucks with 24 inch wheels. They were built by the Jackson & Sharp Car Company, of Wilmington.

Several elements in the construction of the road have

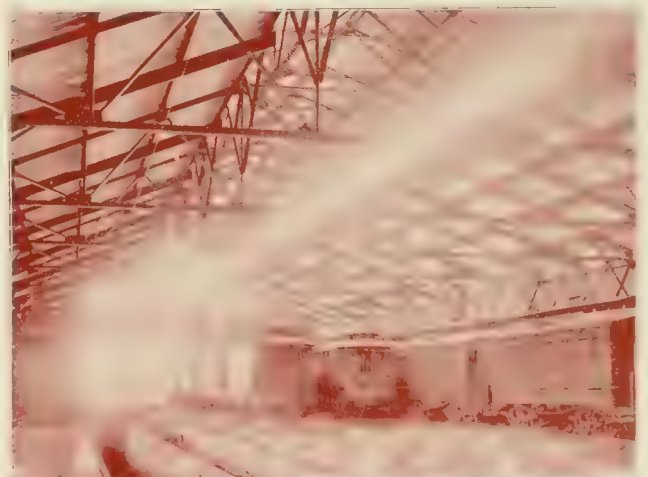


PLAN OF BARN.

required the connections made by the controller in starting are different from those used within the city limits. The change from high speed to slow speed combination is made by a switch under the car accessible to a man standing on the ground at one side. With the slow speed combination the motors are first put all four in series. Then to get the highest speed possible with the slow speed combination the motors are thrown two in series and two in multiple. When open country is reached the motorman turns the switch under the car and the connections of the motors with the controllers are made so that in starting, the motors are put two in series and two in multiple and at highest speed are put four in multiple. On this latter point they will run from 35 to 40 miles an hour. The controller is called the type K 4 B and is the same as the familiar type K2 except that the reversing cylinder provides enough connections for four instead of two motors. The change of connections for high and low speed combinations is made entirely by the switch under the car.

The motor cars are closed, 28 feet inside and 36 feet over all, on double trucks with 33 inch wheels from the New York Car Wheel Works. They have reversible cane cross seats with short side seats at the ends. Cars and trucks are from Brill. Genett air brakes are used

gone to make it more expensive than at first anticipated. Through Tonawanda the company paved the entire street for several blocks with brick and macadam. This was an unreasonable requirement and has had a bad effect on other electric railway enterprises in that part of the country. Town authorities pointing to the example of Tonawanda, have put on conditions in some cases prohib-



INTERIOR BARN - MASONRY PIER CONSTRUCTION.



VIEWS ALONG THE LINE

2. Over the Erie Canal

1. The great Niagara Power House.

3. Typical bit of Highway

itive to electric railway building. Several steel highway bridges were also built along the way, which was of course a very expensive operation. The most important bridges and the roof trusses for the buildings were put up by the Penn Bridge Company, to whom the White-Crosby Company let the contract. Near North Tonawanda a very dangerous grade crossing with the New York Central and Erie Railroads is avoided by elevating the electric road tracks. The bridge over the railroad tracks has three spans,—one of 171 feet and the others of 40 feet. The trestle approaches to these spans are 400 and 500 feet long. The clear space above the railroad tracks is 20 feet.

The buildings were designed by the White-Crosby Company. The car barn is an exceptionally fine building for its class. It is located near the middle of the line. The dimensions are 73 by 63 feet, including waiting room and repair shops. The main entrance is at one end but cars can be run out of the rear and back to the main line on a track laid outside of and parallel with the building.

The road throughout bears the marks of good engineering and substantial construction and both the White-Crosby Company and the railway company have reason to feel proud of it. The financial prospects of the road are excellent. Buffalo is a city of 300,000 people and Niagara Falls is the natural pleasure resort for it. There has long been a demand for such a road from the people of Buffalo and they stand ready to liberally patronize a convenient and pleasant means of transportation to the falls. Besides this a very large business can be expected from tourists and those who make the falls their summer home. In the next few years the industrial village of Echota may be expected to have a rapid growth as a result of the cheap power now available there, and this will add to the value of the road. The only competitor is the suburban service of the New York Central and this can hardly be called a serious competitor unless it is

improved very much over what it is now. Trains are "few and far between." The electric service will give at least a car every 15 minutes. The round trip fare on the steam road is \$1, not including street car fare at both ends. The electric road fare is 50 cents for the round trip including transfers to any part of either city. Another fact adding to the value of this road is that it is now possible to ride by electric cars from Buffalo to Lewiston, N.Y., or Queenstown, Ont., at which latter points the gorge of the Niagara river ends and lake steamers can be taken for Toronto and other Canadian ports. Undoubtedly a large amount of this through business will be done over the electric roads. The Niagara Falls and Lewiston Railroad which will form the connecting link on the American side between the cities named was opened this summer and is popularly known as the gorge route. It runs along the side of the gorge from Niagara Falls to Lewiston within a few feet of the water's edge. The grades are light and the track and road-bed is of the heaviest steam road construction. It is a scenic road only equalled by the Niagara Falls Park and River Railway which parallels it on the Canadian side of the river and gives a view of the gorge as seen from above, whereas the American road gives the view from below. Both these roads will in a measure act as feeders to the Niagara Falls & Buffalo road. The Niagara Falls Park & River Railway was described in our issue of November, 1893, and has been open three seasons. The Niagara Falls & Lewiston, opened this summer, has as officers: Capt. J. M. Brincker, president; R. W. Jones, treasurer; Herbert P. Bissell, secretary; George A. Rickerd, chief-engineer; and J. K. Brooks, superintendent.

Niagara is now certainly a region of electric railways, and there are the best of reasons why it should be, for what is better suited to furnish transportation at one of the world's great pleasure resorts than the convenient, cheap, clean and rapid electric road.

TROLLEY DAY.

The Women's Christian Association of Syracuse Conducts Cars One Day and Clears \$1,000.

The ladies of Syracuse and the street railway officers will hardly be inclined to agree with the sentiment of the REVIEW last month on the question of "Trolley Days." R. M. Douglass, superintendent of the Syracuse & East Side railway is quite enthusiastic over the outcome and



TROLLEY DAY CREW SYRACUSE.

writes us:—"I would say this in connection; our Company's income was just as great that day as any other. The ladies created \$1,070 worth of business extra by their organization and novel advertising, backed by a good cause. I believe that our experience would apply to the other companies of the city. They as well as we received just as much money as we would had we not aided the ladies in this undertaking."

The event was duly worked up for some time through the daily papers and committees of the ladies. Leading business houses agreed to decorate one or more cars, which was carried out in bunting and dainty colored goods and flags; both interior and exterior.

Superintendent Douglass of the East Side line decorated a car very prettily with long strips of red, white and blue bunting, and in the evening it was illuminated with a row of colored electric lights across the front of the car. Every car on this line that night also had the trolley pole illuminated its entire length. Suspended across the road at the terminus at the corner of Burnet and Lock streets was a big white banner bearing the words in red letters: "The East Side Company Welcome the Ladies of the W. C. A.," and at night it was completely framed in red, green and blue electric lights.

All the pretty girls in town were enlisted in the service as conductors. Each was supplied with a white satin badge of office, and a long handled hook trimmed with ribbon of saphro pink with which she reached to ring up fares.

Numerous cars were chartered for trolley parties, and a ball game by newspaper men was given at which De Wolf Hopper umpired, and the gate receipts were \$115.

The street car company furnished the cars with two men each, at \$10 per car for the day.

Superintendent Douglass kindly referred our request for details as to what were the preliminary arrangements for organizing the forces and inducing extra travel, to one of the well known society ladies of Syracuse; one who was a prime mover in the enterprise and who was "Superintendent of the Ladies" on trolley day. Her story is full of interest.

How It Was Done.

"If it will help some other organizations to put a nice sum into their treasury, thereby increasing their influence, I will gladly give the REVIEW our plans for organizing for the work, but whoever goes into it must understand that in order to make it a success it means hard work, for a few at least.

"Trolley Day" is a scheme for making money without any one person or corporation being the poorer for it. It was, as one of the pastors of one of our city churches expressed it in his sermon Sunday. "Democratic, and gave rich and poor alike an opportunity to show their sympathy with a Christian enterprise; everybody was satisfied, everybody was happy; God bless the women and the railways that helped them."

The W. C. A. of Syracuse received the idea of running the street cars for a day from an article in one of our daily papers, saying that the women of Rome, Ga., had controlled the cars for a day there, the whole system being given up to them.

Then the first thing to do was for our association to appoint a committee to interview the officials of the Syracuse street railway companies, which they did. They found Vice-president Kimball willing to consider their proposition, but not until he was assured that the ladies wanted to simply collect the fares, not to control the car in any way, but to have the regular motorman and conductor in their employ control each car.

The result of Mr. Kimball's considering the matter



ELABORATE TROLLEY DAY DECORATIONS

was that, while they could not give up the whole system to the Women's Christian Association, they would give

us twelve cars, four on each of their lines, at \$10 per car; the \$10 to simply pay the running expenses of each car.

We next interviewed Mr. Douglass, superintendent of the Syracuse & East Side Railway. He kindly gave us four cars on their line at the same price, making sixteen cars for the day. We engaged the cars late in July but as so many of our ladies were out of the city we could not carry out our plans until later.

Tuesday, August 25, the managers of the Women's Christian Association met to perfect their plans and organize, the Syracuse Street Railway Company of the

Women's Christian Association, for September 10, 1895. We resolved to conduct our railway on strictly business principles and we organized a regular company, not forgetting an attorney. A committee was appointed to secure offices in the central part of the city for the transaction of our railway business. When the committee was appointed some of the ladies said, "Pray tell us what we will need of officers?" but they soon found out. The following day the

rate the cars for us, which they did free of expense to us and they were all a beautiful sight. We interested a great many of society people, some as chaperons and conductors and others to get up trolley parties. We advertised that we would charge only the regular fare, that the conductors would be instructed to return change to each passenger unless they were told to keep it and that no one need be afraid to ride on the decorated cars for fear that it would cost them more than they wanted to give. We believed in advertising, which we did by putting banners on the cars several days before "Trolley Day."

I will enclose a badge, showing the chaperon's and conductor's credentials for the day. Of course these few points do not cover all the details of the work but the principal ones. "Trolley Day" was a success in every way and we feel repaid for our work as we have the sum of \$1,071.60 net.

Yours Sincerely,

MRS. CHARLES P. MOSER.

812 Southwest Street.

The officers mentioned included a full quota of executive officers; board of directors; committees on decorations; badges and press.

The ladies at Auburn, N. Y., also gave a trolley day last month.

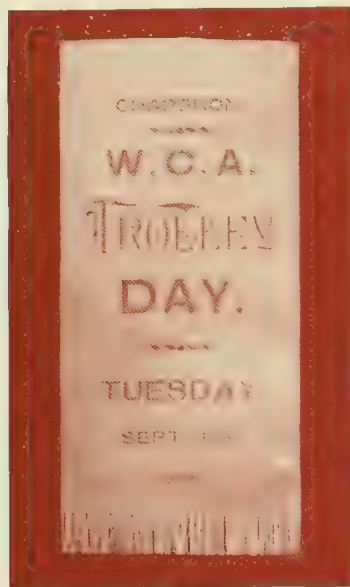
THE CAST JOINT.

No more important topic could have been assigned for an exhaustive paper and discussion at Montreal than that of the cast joint. The joint problem, always referred to as "the troublesome joint" has occupied many hours in the past, but never has the joint been as far advanced as at the present. At this writing it is not known whether "cast joints" will be on the program, to be, but not yet issued. Its omission could hardly be explained.

Great progress has been made in that most emphatic test of all—installation—since a year ago, and it is now an assured success. The Falk Manufacturing Company which owns the patents and does the installation has had a busy year. It has now put in joints on over 100 miles of track, on the Consolidated Traction Company of Newark; the Chicago City and West Chicago roads; and the National Railway of St. Louis. The joint is not thrown out of alignment by the heat of summer and has also endured 25° below zero. Breakage of joints at St. Louis was only three joints out of about 1,000. After these breaks are again welded up and a section put in to fill out space, no further breakage will occur.

A cable railway 1½ miles in length will be built at Douglas, Isle of Man, connecting with the present street railway.

The new Buffalo & Williamsville, N. Y., Electric Railway Company has elected John Blocher president and manager; E. C. Longnecker, vice-president; and A. L. Rinewalt, treasurer.



THE BADGE.

superintendent was notified that the Business Men's Association had offered us the use of their rooms, which we gladly accepted. Here we had two extra desks put in for the superintendent and the secretary and treasurer. One of the business colleges kindly donated us the use of a stenographer and a machine, then we sent out letters to the different business men's associations and social clubs, asking them if they would let us mention in the daily press that they would patronize our cars. This brought us before them and they replied that they would gladly do so, which was encouraging, but I must mention the first and most important part, and that is to get the co-operation of the daily press. We feel that we owe a great measure of our success to the thorough articles given us in the daily newspapers, as we progressed in our plans, indeed one of the papers gave us the name of "Trolley Day," and they all kindly followed it.

Our next plan was to interest just as many people in the scheme as possible, so we decided to schedule our time for each chaperon and conductor to two hours, which meant that we must secure the services of more than two hundred ladies to act as chaperon and conductor, but this we had no trouble in doing, as by this time there was a wide spread interest felt in the scheme, the people along the different lines of railways being particularly interested. We asked some of our merchants to deco-

THE MOUNT HAMILTON INCLINE RAILROAD AT HAMILTON, ONT.

BY JOHN FENSOM, CHIEF ENGINEER.

The road is conveniently situated in the eastern part of the city, and connects with all the leading thoroughfares leading to and from the city, and with the G. T. R. and T., H. & B. R. R. at the foot of the incline. It is of similar construction to other inclines, having a double roadway, with a car upon each, coupled to one cable, so as to counterbalance each other, and is driven by powerful steam engines, placed at the top of the incline. It is adapted for carrying passengers, vehicles and other freight, and has a capacity for two loaded wagons or one load of hay, besides passengers. Each car has a neat and substantial passenger coach for seating about twenty-five persons, besides standing room and if necessary the whole of the platform of the car may be used for passengers with safety, as it is enclosed with an iron fence. All the principal inclines in the United States were inspected to obtain information, and no trouble or expense was spared to have all the latest and most approved machinery and appliances for safety, and now that the road is completed it is pronounced by competent judges to be the strongest, best arranged and most complete plant to be found anywhere. The whole of the work, including grading, track laying, excavation for foundations, erection of engine house, and other buildings, building and erection of machinery and starting, was executed in less than five months without accident of any kind. While no expense has been spared to have every thing first-class, by careful management and economy the whole has been completed for less money than any of the inclines visited.



MOUNT HAMILTON INCLINE.

To the judicious management, energy and care of Jno. N. Lake, the company's secretary and managing director is due this successful and economical carrying out of the work.



MOUNT HAMILTON INCLINE—POWER STATION.

Wires chosen promiscuously from the wire to be used for the cables were subjected to three tests before being accepted. 1st—A piece of the wire was hammered flat and very thin without sign of flaw or crack. 2nd—A piece was subjected to a torsional test by twisting. 3rd—A piece was subjected to a tensile strain in a testing machine for showing the load each single wire could sustain. These tests were very satisfactory.

The location being free from foot hills, and the top of the mountain level, it was decided to dispense with trestle work, and by blasting and filling in to have a solid road bed. Strong retaining walls are built where deemed necessary to prevent sliding, and the whole bed is well drained. A broad gauge and heavy rail was chosen to add to the stability as well as the capacity of the trucks.

The buildings connected with the incline consisting of the engine and boiler house, and engineer's house at the head of the incline, as well as the superintendent's house, and the pumping station at the foot of the incline are built of brick with stone foundations and finished in a very superior manner. The road is provided with a complete electric light plant, consisting of a 25-horse power engine and dynamo, with connections for lighting the passenger car, grounds and platforms. There is also a small pumping station situated near the foot of the incline with water mains and steam pipes extending up the incline to the engine house. This pump is driven from the main boilers, and is for supplying the water for the boilers and other purposes. The boilers, engines, and winding machinery, as well as the electric light plant are contained in the engine house at the head of the incline. The cable wheels are beneath the top platform in a room excavated in the solid rock.

The cars are built up of timber strongly braced with wrought iron, so as to combine rigidity with strength. The platforms are divided into two driveways for teams, enclosed with an iron fence and entrance gates. The passenger coaches are placed upon the outer side of the cars

and have separate entrance gates. There are two very strong draw beams to each car, strongly framed in and braced with wrought iron, one to receive the main cable, and the other the safety cable. The draw bolts and drawheads are made of mild steel with a tensile strength greater than that of the cables. They are arranged with powerful nuts for taking up any slack in the cables.

The mechanism for the safety cable which is automatic and arranged in a manner approved of by the United States government consists of a steel cable of the same size and strength as the main cables, attached to the safety beams

overcoming the counterbalance weights, and dragging the safety wheel truck forward until the safety wheel is brought into contact with a strong brake shoe. At the same time by means of powerful toggles and clamps the safety cable is tightly gripped to prevent it slipping upon the wheels when the safety brake and clamps are brought into action. The cars are held securely until the necessary repairs or adjustments have been made.

In addition to the above safety system there are at the head of the incline, strong steel safety locks which automatically lock the cars upon their arrival at the top and prevent their descending until unlocked by the engineer in



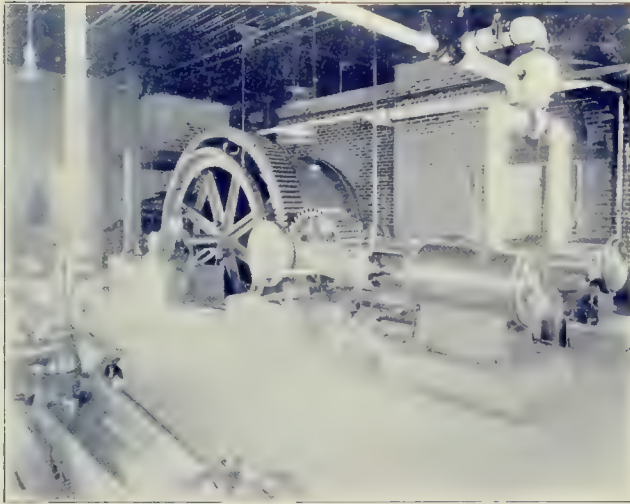
TRACK CONSTRUCTION AND VIEW OF HAMILTON, ONTARIO

by means of one of the beforementioned draw bolts. This cable, one end of which is attached to each car runs upon three very strong wheels placed beneath the platform at the head of the incline. One of these wheels is mounted upon a truck provided with suitable truck wheels and tracks which allows of a backward and forward movement to accommodate itself to the varying length of the cable. Heavy counterbalance weights act upon the truck to keep the cable taut. As long as the main cables are in working order the safety cables have only the strain upon them required to keep up the slack of the cables, but should the main cable break then the whole weight of the trucks is transferred to the safety cables

the pilot house. At the bottom of the incline are strong air cylinders, two for each car, to act as buffers. There are also strong spiral springs let into the breast beams of the top and bottom platforms to further reduce the shock of stopping of the cars. In the ordinary working of the road the trucks will not run up to the platform within a few inches, and the space so left is covered with a hinged flap which will move up with the car.

In fixing the dimensions of the cylinders of the main winding engines, care was taken to have only sufficient area to lift the maximum loads upon the cars without surplus power to overstrain the cables and machinery. There are two steam boilers for supplying the engines of

the winding gearing, the electric light plant, and the pump, either of them of sufficient capacity for the ordinary work of the incline. The feed water is filtered and heated by passing a heater and filters. There are



CHIEF WINDING ENGINE.

two balanced piston slide valve engines coupled together at right angles upon one engine shaft and controlled by link motions and levers. Upon this shaft is a very powerful cast iron pinion, having machine-dressed cogs and geared into the main gear wheel, which is clogged with hard maple. This gear wheel is keyed to the drum shaft, and has upon it a large brake rim and a rim for the main drum. Upon the other end of this shaft is a strong cast iron rim for the drum. The drum is built up of strong oak lagging, securely bolted to the rim. There is also a very strong cast iron rim bolted inside the drum, for additional strength. Upon the outer rim is a large brake rim, to operate in unison with the brake upon the main gear wheel. All the engines and winding machinery are built upon stone foundations, extending down into the solid rock and secured with large foundation bolts bored into the bed rock.

The pilot house is in the center of the top platform. From it, by means of levers, the engineer has full control of the engines, winding machinery, brakes, and safety hooks, all of which can be controlled with ease and precision. The cables are kept in position upon the drum by means of automatic cable placers of especial design, driven from the main drum shaft by means of gearing. This method of guiding the cables prevents their chaffing together as the cables wind on and off the drum. There are suitable carrying wheels up the roadways and wherever the cables require them.

The following are the principal dimensions:

Width of road bed	44 feet
Gage of tracks	12 "
Length of road bed	717 "
Total height from the bottom platform to the top platform	303 "
Grade of incline, about	44.75 ft. per 100 ft.
Weight of rail, per yard	80 pounds

Ties (oak)	6x8 in. 16 feet
Distance between ties	20 inches
Strain on cables per 2000 lbs., due to the incline and friction on rope wheels, about	850 pounds
Length of cars	30 feet
Width of cars	20 " 6 inches
Weight of cars, each	13 tons
Diameter of front wheels	30 inches
Diameter of hind wheels	40 "
Axles (hammered steel) diameter	5 "
Cables (crucible cast steel, 19 wires to the strand)	1½ "
Breaking strength of cables	139,000 pounds
Safe working load	27,500 "
Maximum load on cars	18,000 "
Maximum strain upon cables with a maximum load	18,700 "
Strain upon cables with an ordinary load of say 3000 pounds upon the car	12,325 "
Factor of safety with ordinary loads	11¼ "
Speed of ascent and descent, per minute	500 feet
Time required to make one trip, including starting and stopping, about	2 minutes
Horse power required to lift a maximum load of 18,000 lbs. at a speed on the grade of 500 feet per minute, about	150
Power required to lift loads of 3000 lbs., about	35 horse-power
Number of boilers	2
Length of boilers	14 feet
Diameter of boilers	5 "
Shell, steel	¾ inch thick
Heads, steel	1½ " "
Longitudinal seams, double riveted	
Cold water test	175 pounds
Working steam pressure, about	90 "
Engines	17-inch bore, 24-inch stroke
Engine shaft (hammered steel), 7 inches in diameter, increased in center for wheel	
Main drum shaft (hammered steel)	10 in. in diameter
Power of engines, about	150 horse power
Power of boilers, about	150 " "
Main gear, diameter	12 feet 6 inches
Face	16 inches
Pitch	3½ "
Main pinion, diameter	3 feet 6 inches
Winding drum, diameter	10 "
Brake rims, diameter	10 "
Sheave wheels for main cable, diameter	7 "
Sheave wheels for safety cable, diameter	6½ feet
Shaft in sheave wheels (hammered steel), diameter	6 inches

The officers of the company are J. T. Middleton, president; John Thomson, vice-president; John A. Lake, secretary and treasurer.

PAY OR GET OFF.

A St. Louis man, who, should have known better, boarded a cable car in the middle of the block. As it was not a stopping place the gripman pursued the even tenor of his way. This made the passenger mad. He refused to pay. He was put off after riding six blocks. Then he goes and gets a daily paper to print the story of his woes, adding that the conductor had been discharged and a bulletin issued that persons refusing to pay should be allowed to ride rather than incur damage suit for their ejection.

Capt. McCulloch, general manager of the Citizens, lost no time in issuing an order fully covering the duties of conductors toward non-paying passengers and the prescription was not written to be taken in any homeopathic doses, either.

A BIG CONCERN.

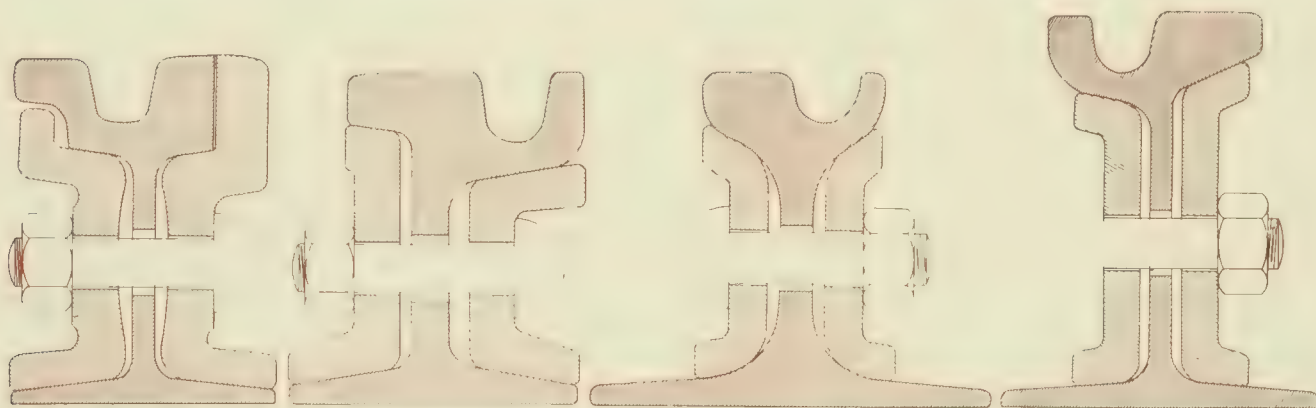
Convention delegates as they cross the line and begin inquiries as to where this and that material is obtained, will be surprised to learn to how large extent Dick, Kerr & Co., Ltd., of London, have contributed. In England, Europe, Africa, Australia and Canada the well-known name stands for ability, progress and honorable dealings.

The chief product handled by this company is rail and special track work. Fifteen years ago Dick, Kerr & Co., became the selling agents for the Phoenix Company, that great iron concern whose works and workmen constitute the town Laar, Germany. The Phoenix has additional plants at several other points and has an annual output of nearly 500,000 tons.

Within the past three years Dick, Kerr & Co., have sold in Canada for street railway use at Montreal,

SHORT CIRCUIT IN WASHINGTON CONDUIT.

The small boys of Washington, D. C., have tried in vain up to present writing to short circuit and shut down the Ninth street electric conduit road of the Metropolitan Railroad Company by sticking wires into the conduit and between the conductor rails but the circuit breakers were set for such a heavy current that the boys' efforts have resulted only in the instant melting of the offending wires. It remained for an innocent old colored woman with a rickety baby carriage to really make trouble. While crossing the track the metal tire of one of the baby carriage wheels dropped off and fell into the conduit through the slot. As luck would have it, it fell across the two conductor bars and made such a serious short circuit that the road was shut down for about an hour until the trouble was found.



TYPES OF DICK, KERR AND COMPANY, RAIL SECTIONS.

Toronto, Hamilton, London and a few other points, not less than 35,000 gross tons of rails which have been used on electric lines. The company have a very extensive variety of rail sections, some of which are shown herewith.

Dick, Kerr & Co. also built the first cable road in Edinburgh, taking the contract to install the entire plant including equipment. So well pleased were the city officials with the working of the system, a recent and very extensive contract has been awarded for additional cable lines. This concern also built the South London Tramways Cable which extends from Westminster street bridge to the summit of Brixton Hill. This line uses Cradock cables.

The American agent of Dick, Kerr & Co., is Pettin-gill-Andrews Company, Boston and New York, whose railway department is under the management of F. X. Cicott.

"The trolley is doing a noble work" says the Bridgeport, Conn., Standard. "During the past week 13 dogs have been killed by the trolley on East Main street. None of the animals were of much value. After the East side is cleaned out, it is hoped that they will begin to rid this side of a few of the useless dogs which are running about the streets. After this is done, they might well begin on cats."

A PHYSICAL ILLUSTRATION.

A few days ago a case was on in which a claim agent of one of the roads here was in court for having fired a newspaper man out of his office. The company's attorney in the course of the examination of the witness, who was the aforesaid reporter, asked in what manner the ejection occurred.

"He used force," replied the witness.

"Illustrate," rejoined the barrister.

"Show you the same way as Smith did?"

"Precisely."

"Please turn around."

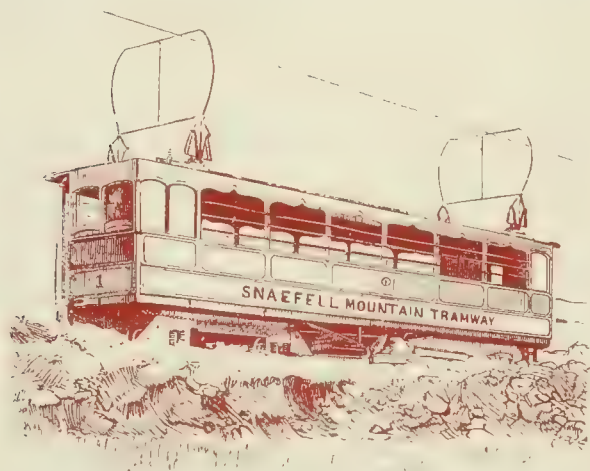
The attorney complied, and then ensued a remarkable and to the bystanders highly interesting exhibition. The witness grabbed the lawyer firmly by both shoulders, and pumped him a few times until he was all out of breath. Then he dashed him across the room and banged him savagely against the door twice. The lawyer had not had time to even think, and as he came to, witness regretfully remarked:

"I am very sorry Smith didn't kick me, so that I could kick you too."

One other witness who claimed to have been likewise ejected was not called upon to illustrate the exact manner of his departure, but was confined to oral testimony only.

SNAEFELL MOUNTAIN RAILWAY.

For the convenience of tourists an electric railway has been built from Laxey up Snaefell Mountain, in the Isle of Man, Great Britain. The line is $4\frac{3}{4}$ miles in length and rises 1,820 feet, winding about the mountain peak in



a spiral. The gage is 3 feet 6 inches. Three rails are used, the two outer weighing 50 pounds and the center 65 pounds per yard. The power house, distant $2\frac{3}{4}$ miles from the Laxey terminus, supplies a total of 700 horse-power at a pressure of 500 volts, and contains 5 compound horizontal engines, each driving an independent generator. At Laxey is a battery of 246 chloride accumulators which equalize the load on the generators.

The cars are 35 feet in length, with seats for 48 passengers, and are carried on double trucks. Each of the four axles has a motor and in addition separate motors are geared to the horizontal wheels which grip the center rail at steep places. With traction on so many wheels the speed is easily 9 miles per hour up hill. Each car has a powerful track brake which grips the third rail. Contact with the overhead wire is effected by two sliding cross bars, spring supported.

HIGH SPEED SYSTEM.

High speed promises not to be confined to the steam roads in Europe, where several lines have been racing against time and each other. A German has planned an electric elevated system for Berlin which claims ability to run at 186 miles an hour. The cars are suspended, the centre of gravity being very low. Friction plates prevent the derailment of the wheels, and they are secured to the motor case in the usual manner, the shocks being taken up by springs. The car is fastened to the motor in such a way by a centre pin as to permit of lateral play, and is suspended by springs, ensuring easy riding. Each truck has four wheels, and is provided with brakes, which take hold of the rail at top and bottom. Each car has two motors and seats 50 people.

Hartford, Conn., requires lights after sunset on the rear ends of street cars.

HOMEMADE PARTY CAR.

It was rather late in the season when the Columbus Street Railway Company, of Columbus, O., decided to have a special car for trolley parties. To be of any use this season the car had to be built in short order. Accordingly one of the company's 20 large cars was run into the shop. Three days later it came out completely transformed. Seats were replaced with carved rattan chairs, the headlight by a great star of incandescents. Beautiful curtains of delicate green hang from the sides and behind the vestibules. On floor is a green Brussels carpet of harmonious shade and the ceiling is bird's eye maple, tastefully painted. Interior and exterior are shown in the engraving.

A blaze of light is shed from the 238 lamps on the car. All are of 16 candle power, the exterior rows being alternately white and red. The white interior lamps are fitted with ornamental etched shades.



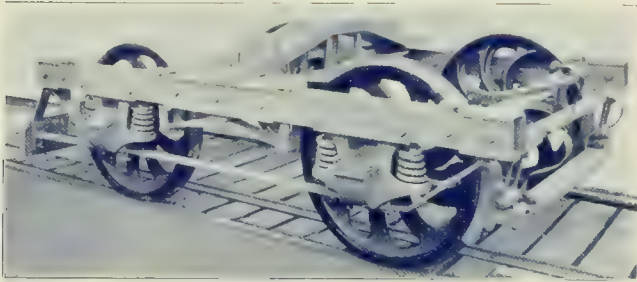
HOMEMADE PARTY CAR - COLUMBUS, OHIO.

On her maiden trip with a party of the company's officials the "Electra" created a decided sensation over the 30 mile route, and has been in great request every night since, except Sundays. Usually the car is engaged

from 3 to 5 days in advance. It is let to parties of 20 or 25 at the rate of \$10 for 2 hours or less and \$2.50 per hour after, until midnight. Superintendent W. F. Kelly will reap quite a harvest before outdoor festivities are cut short by the chilly blasts of Lake Erie.

FROM THE BARNEY AND SMITH WORKS.

We present herewith an illustration of the new "Class E suspension spring truck" which is one of the latest



BARNEY AND SMITH'S NEW TRUCK.

and best features of the Barney & Smith Works, Dayton, Ohio.

A glance will tell the story of its compact, durable construction. Our other engraving shows the interior of an interurban car which will go into service this month.



NEW STYLE INTERURBAN CAR.

Seats are reversible, cross, heavily upholstered. Windows are unusually large, shaded with roller spring curtains. The entire furnishing of the car is neat and attractive but avoiding anything gaudy. An electric push

button at each seat enables passengers to secure the attention of conductor or motorman without resorting to the waving of umbrellas and putting out other peoples' eyes.

THE FOURTH AT TERRE HAUTE.

Fourth of July returns are still coming in, the latest from Terre Haute shows 47,000 passengers hauled in a city of 32,000 population and without accident. There



are few occasions, if indeed it has ever been beaten, where a line has handled a business amounting to 50 per cent excess of population. Our illustration shows a few people waiting to take cars at seventh and Main streets. President Harrison is to be congratulated.

KILLED BY SHOCK.

The trolley wire of the West End Street Railroad at Rockford gave John J. Clark of that place a shock that resulted in his death September 17. Clark was cutting down dead trees in front of his employer's property and to facilitate operations cut a guy wire attached to one of them so that it fell across the trolley wire. He afterwards took hold of the wire which was of course alive, and fell as if dead. When he was picked up the current had been going through him for some time and he was beyond recovery. When he fell he made contact near his heart, which no doubt assisted the electrocution. We mention these facts simply as a warning to those in the electric railway business who may have been taught that 500 volts will never kill. It has now been abundantly proved that this pressure will sometimes kill a healthy man under very favorable conditions as has been shown by several cases recently. Men should govern themselves accordingly. Probably hundreds of men receive 500-volt shocks every day without serious consequences but the few fatalities that have occurred show that it pays to be careful.

Did you know the Westinghouse motors were used on cars in Bethlehem, Syria and across the river Jordan? Well they are; and all these places are in the state of Pennsylvania, too.



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CORRESPONDENCE.

We cordially invite correspondence on all subjects of interest to those engaged in any branch of street railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

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NEW YORK electric railways are being investigated by a legislative committee. These investigations accomplish nothing except to waste the time of a great many people by giving the members of the committee an opportunity to draw extra pay and at the same time hoodwink the citizens of the state into thinking they are doing some work.

AMONG the topics to be discussed at the Montreal convention of the American Street Railway Association should be some plan for bringing the claim departments of the street railways into closer relationship with each other. The object is by a series of regularly issued reports to bring to the notice of each claim agent, cases where there is suspicion of fraud. In the Claim Department, page 620, in this issue, the subject is more fully discussed. The simplest method would be to work in connection with the American Street Railway Association, which is already organized, and needs a few features that will be of practical value to all of its members all the time.

THE female sex has made great progress in asserting her rights to share the occupations formerly shut to her. It has been coming steadily, beginning with the professions, and of recent years so enlarged as to take in those occupations involving more or less manual labor. Female barbers no longer occasion surprise and as the new

woman becomes newer and perhaps "fresher" we may in the near future expect to see female conductors on our street cars; just as there have been for years in some countries. It is not impossible that these "Trolley Days," a society woman's charity fad, may be the means of opening the door of yet another means of livelihood to working woman.

JOIN the Association. There are upwards of seven hundred electric railroad companies in the United States and Canada, every one of which should be a member of the American Street Railway Association. As it is, there are only one hundred and eighty-six members including horse, electric and cable roads. The proportion of membership to the whole number is altogether too small. Not a few companies send delegates and participate in all the advantages of the organization, but for some reason neglect to enter the fold and thus greatly strengthen the organization. The association is a recognized power, becoming stronger each year. If your company is not yet a member, the present month is a good one to begin: "Now is the time to subscribe."

SUPPLY men and manufacturers of materials report a busy time. Street railway managers and contractors on new work complain of delay in receiving material. Work is stopped. Improvements are delayed. Prices have gone up. Dealers say they are three months behind on deliveries, because every body waited till the last minute and wanted his stuff at once. There were so many in the same situation that all could not be accommodated. This state of affairs ought not to exist. Not that we object to the supply trade being crowded beyond its ability to fill orders, but because it would be more to the advantage of roads to order their supplies early in the season. The supply trade would have just as much business as it does at the present time, for there can be no more goods sold than there is demand, and it could give better satisfaction to customers because, it would be in position to fill orders without delay on account of demand being more evenly distributed. A little foresight on the part of managers would be to their advantage, for orders placed early in the season usually find a lower market than orders placed when the season is at its height.

EACH year there seems to be more of a tendency to build electric cars on the lines of steam cars. How far this will be carried it is hard to say. There is no doubt but that the usual construction of steam coaches is crude as compared with street car construction. The horse car was evolved from the omnibus and the object was to get the greatest strength for a given weight regardless of cost. The modern electric car is the direct descendant of the horse car. Steam car builders on the other hand were under no such necessity to keep the weight down. Grades on steam roads were not severe and it was also desirable to make cars heavy enough to roll down embankments and perform other antics with a minimum damage to passengers. While in general a steam car construction is comparatively cheaper in first cost, and also cheaper to

repair, it costs more to haul such a car over a road and wears out the track faster. All these points will bear consideration. The cost of hauling the additional weight can be approximately calculated. The track maintenance cannot be determined as closely. The additional size of motors to haul the heavier cars must also be considered.

WE were once talking with a supply man who has extensive dealings with both steam and electric railways, and the charge was made by him that the majority of those in charge of street railways are not genuine railroad men. That is, many of them have little idea of the mechanical details of railroading and make no effort to study them. We of course, did not agree with him, but his remarks could not have been entirely without foundation and the root of the matter is probably this. The size of the majority of street railway systems is not great enough so that the work of administration is subdivided anywhere near as much as on steam roads. This prevents to some extent as close and accurate a study of various details as is possible on steam roads. This fact only emphasizes the necessity on the part of street railway men to study closely and scientifically all the mechanical and electrical details connected with their work as it is only by such study that they will be able to do as efficient work as their more favorably situated steam road brothers. The general manager often has so many various problems crowding in upon him that he cannot look after the mechanical features. In such cases the manager should hire men who are competent to look after motive power and rolling stock and give them power to act.

The plan which has been attempted for two years past, but utterly failed this year, of printing and distributing in advance of meeting, the papers to be there presented is one which should be adopted and enforced. Other associations of very much less importance have done so for years. The result is a vast amount of valuable time can be saved if desirable, by simply reading the paper by its title, leaving the time thus saved for a general discussion, which after all is or would be by far the most valuable feature of the work. A man writes a paper: it reflects only his own views or experiences which may be radically wrong and misleading. Possibly he secures the views of several other managers, in which event his work of collating the symposium increases the value of his essay in proportion to the number so quoted. Unlike many associations the amount of research and original experiment by any one individual is too small and unimportant to give it great value. Hence it will readily appear; that the largest amount of good must come in proportion to the number expressing their own experiences. How many papers in the last ten years have been based chiefly on initial experiment of its author? Not one a year. Managers and others honored by selection as writers for the convention, have ten months in which to prepare, and there should be no difficulty,—nor would there after once enforcing the rule. Papers not in the secretary's hands at the appointed time should either go over one year or forfeit their opportunity

entirely. Where delegates can study a paper before leaving home they have opportunity to come prepared with facts and figures, no man would want to trust to chance recollection.

THIS mooted question of the dues, which promises to form the topic of an interesting discussion in the executive session, is by no means a new one. When the association was being organized by the adoption of by-laws this same matter was hotly contested for over an hour. The large roads wanted the dues the same for all member roads regardless of size; and the small roads wanted the cost pro rated on a car basis. The proposed scheme to pro rate on a basis of earnings is practically the same thing. One road then represented, owned one car and three horses. While it is not for the REVIEW to anticipate the action of the association, we cannot refrain from expressing our conviction that any attempt to make the burden heavier on some than on others will not meet with favor. Roads join the association and pay their dues, partly for the good they can gain and partly for the general good of the cause. Some very large roads are members which by distance are so remote from the meeting place they are never represented. Personally then they would derive just as much benefit from the stenographic reports published by the REVIEW a few days after the meeting, as by paying dues and getting the official report from six to ten months after the meeting was held. As a matter of fact the large roads recognize the value and necessity of a good organization, but it is also true that the larger the road the less the necessity of the association to the road. Such roads can send their men to any part of the country, and do, to study any new departure; while the manager of a small road can only once a year get in touch with his fellows and obtain ideas and experiences as he mingles with other managers. The membership of the association is far below what it should be, having on September 30, 1895, only 178 members out of a possible 800 or 900. There are very few roads which are excusable for not joining. Many of them attend the meetings, share in all the benefits and pleasures but do not become liable for any dues. The initiation is \$25 and the annual dues \$25, which gives the association an income of \$4,500 per annum from dues alone and which amount should be sufficient with good management to conduct in proper style all its business really essential and necessary. In our judgment the payment to "committees" who are invited to "report;" in other words, read papers before the association, is unnecessary. It has been the custom to date to pay the chairman of such "committee," the sum of \$50 for his labor and the expense in gathering the data. The honor of appearing before the convention, and the prominence thus attained is such, that the "committee" could well afford to pay the association handsomely for the privilege. Of course this is impossible. At the same time the saving of several hundred dollars each year would in no instance prevent the securing of all the papers wanted, and from the sources desired, too.



This department is devoted to the construction and operation of electric railway power houses. Correspondence from practical men is specially invited. Both the users and makers of power house appliances, are expected to give their views and experiences on subjects within the range of the department.

It does not always require very refined engineering talent to find out where some of the money is leaking in the operation of a power house. A superintendent was relating the other day how he had made a big cut in the fuel bill and reduced the number of boilers in operation. How did he do it? Simply by going inside the boilers himself and seeing how much dirt there was and where it was located. Of all the ways that fuel is wasted in a power plant, probably the most common is that of trying to get the heat through a thickness of scale and dirt. In fact it may be said that the boiler room offers ten opportunities for loss where the engine room offers one.

* * *

We referred last month in this department to the movement we have inaugurated of collecting figures on the performance of the various electric railway power houses in the country. It is a movement for which a great number feel the need and we have received many letters commending it. Herewith are the reports from eight roads, other installments to follow later. When a sufficient number has been collected the results will all be brought together in tabulated form. Each road is given a number for convenience in reference and for identification in cases where the name is withheld. The results are from a fair variety of stations and as to economy are in some cases very gratifying.

No. 1.—Cincinnati, Newport & Covington Street Railway, output about 15,267 electrical-horse-power-hours per day. Readings at switchboard taken every half hour. Station operated 21 hours per day. Equipment: four 250-horse-power Sterling water tube boilers and four 150-horse-power Babcock & Wilcox; hand firing; live steam heater; four 500-horse-power vertical marine type compound condensing engines, belted direct to Westinghouse 375-kilowatt generators. Fuel used is Ohio slack and nut, half and half, costing \$1.02 per short ton at the power house. Results:—

Fuel consumption per e. h. p. hour.....	6 1-7 pounds
Cost of fuel per e. h. p. hour.....	\$.00316

Water evaporated per e. h. p. hour.....	22 pounds
Water evaporated per pound of coal.....	3.65 "
Cost of station labor per e. h. p. hour.....	\$.00166
Interest on cost of station per day.....	\$17 40
Amount of other fixed charges per day.....	\$12 60
Cost of oil and waste per e. h. p. hour.....	\$.00024
Total cost of power per e. h. p. hour.....	\$.00759

No. 2.—A combined railway and lighting plant. The results include both services. Output at switchboard, about 720 electrical-horse-power-hours on street railway load, and 1,788 on lighting. Readings taken every hour. Street railway run 18 hours and lights 10. Equipment: Two 60 horse-power and one 130 horse-power Babcock & Wilcox water tube boilers; one exhaust heater; two compound 13x22x13-inch Westinghouse engines, one on railway and one on lighting load (one with condenser); one compound 14x22x11-inch Ideal engine on lighting load. Pittsburg steam lump coal is used, costing \$3 per ton at the power-house. Results:

Fuel consumption per e. h. p. hour.....	4.3 pounds
Cost of fuel per e. h. p. hour.....	\$.00645
Water evaporated per e. h. p. hour.....	28.38 pounds
Water evaporated per pound of coal.....	6.6 "
Cost of station labor per e. h. p. hour.....	\$.0014
Fixed expenses, not including interest on station, per day..	\$12.50
Cost of oil and waste e. h. p. hour.....	\$.00039
Total cost of power (not including fixed charges) per e. h. p. hour.....	\$.00824

No. 3.—Macon Consolidated Street Railroad. Report is the average of one winter and two summer months. Average output at switchboard, 2,038 electrical horse-power hours. Day's run, 15 to 20 hours. Equipment: Two horizontal return-flue boilers, 16 by 6 feet, fired by hand; two feed water heaters, raising temperature of feed water from 72° to 185°; two McIntosh & Seymour compound condensing engines, 15x17x23 inches, 200 revolutions, connected by clutches to a connector shaft between them, from which are belted four 100-kilowatt multipolar generators. Coal costs \$2.55 per ton at the power-house. Results:

Fuel consumption per e. h. p. hour.....	4.9 pounds
Cost of fuel per e. h. p. hour.....	\$. .00622
Cost of station labor per e. h. p. hour.....	.00367
Cost of oil and waste per e. h. p. hour.....	.00016
Total cost (without fixed charges) of power per e. h. p. hour.....	.010053
Cost of motive power per car mile.....	.00882

No. 4.—Output about 3,150 electrical horse-power-hours per day. Station run 18 hours. Records by recording wattmeter. Equipment: return-flue boilers; open heater, non-condensing simple corliss engines

belted to line shaft. Fuel is Iowa screenings, costing \$2 per ton at the power-house. Results:

Fuel consumption per e. h. p. hour.....	5 pounds
Cost of fuel per e. h. p. hour.....	\$.008
Water evaporated per e. h. p. hour.....	35 pounds
Water evaporated per pound of coal.....	4.3 "
Cost of station labor per e. h. p. hour.....	\$.003

No. 5.—Output 46,000 electrical horse-power-hours per day. Readings taken at switchboard every five minutes. Station operated 24 hours a day. Equipment: fifteen 300-horse-power Lancashire boilers; hand firing; feed water drawn from condensers at 95° and run through Green economizers, entering boilers at 245°; six 600 horse-power cross compound condensing corliss engines direct belted to generators. Fuel is bituminous screenings, costing \$2.50 per long ton at power-house. Results:

Fuel consumption per e. h. p. hour.....	2.78 pounds
Cost of fuel per e. h. p. hour.....	\$.0030
Interest on cost of station per day (at 8%).....	\$110.00
Total cost of power per e. h. p. hour (average of four summer months) not including interest.....	\$.0047
Cost of motive power per car per mile (average of four summer months).....	\$.0094

No. 6.—Citizens' Traction Company, Pittsburg, Pa. Output about 4,500 electrical horse-power-hours a day. Station operated 24 hours a day. Equipment: three return-flue, 16 feet by 66-inch horizontal boilers; Murphy smokeless furnace (automatic stokers); one 300-horse-power live steam heater; three 150-horse-power Buckeye tandem compound medium speed condensing engines, direct belted to generators. Slack costs 79 cents per short ton at power-house. Results:

Fuel consumption per e. h. p. hour.....	3 pounds
Cost of fuel per e. h. p. hour.....	\$.0012
Water evaporated per e. h. p. hour.....	20 pounds
Water evaporated per pound of coal.....	6.6 "
Cost of station labor per e. h. p. hour.....	\$.002
Interest on cost of station per day.....	1.00
Amount of other fixed charges per day.....	\$.00
Cost of oil and waste per e. h. p. hour.....	\$.00015
Total cost of power per e. h. p. hour (excluding fixed charges).....	\$.00335
Cost of motive power per motor-car mile.....	\$.0094

No. 7.—Cass Avenue & Fair Grounds Railway, St. Louis (taken from report in February, 1895, REVIEW.) Output about 14,469 electrical horse-power-hours per day. Readings taken at switchboard every 30 minutes. Station operated 24 hours a day. Equipment: Horizontal return-flue boilers; hand firing; open feed water heater; non-condensing simple corliss engines, direct connected, 1,000 horse-power each, except one small unit of same type for owl-car load. Coal, Illinois bituminous lump. Results:

Fuel consumption per e. h. p. hour.....	5 pounds
Water evaporated per e. h. p. hour.....	30.19 "
Water evaporated per pound of coal.....	6.04 "
Cost of motive power per motor-car mile (excluding fixed charges).....	\$.0152

No. 8.—Output about 2,188 electrical horse-power hours per day. Station operated 17½ hours. Equipment: three tubular 16x5-foot horizontal return-flue boilers; hand firing; Reynolds' feed water heater, 11x42 (336

horse-power); one 22x42 Allis-corliss simple condensing direct-belted engine in use; two 14x42 simple Allis-corliss condensing engines belted to line shaft, in reserve. Coal is bituminous slack, costing \$1 per ton. Results:

Fuel consumption per e. h. p. hour.....	5 pounds
Cost of fuel per e. h. p. hour.....	\$.0025
Water evaporated per e. h. p. hour.....	23 pounds
Water evaporated per pound of coal.....	4.6 "
Cost of station labor per e. h. p. hour.....	\$.005
Cost of oil and waste per e. h. p. hour.....	.00012

In very few cases is as full a report returned as was asked for, but enough figures are given to be of value for comparison. The figures are the result of every-day commercial measurements, and, of course, are not as scientifically accurate as would be the results of special tests. Nevertheless, it must be remembered that such figures are the ones that count in the financial results. If, on comparing performances, it is found that bad records are due to errors in the water meters or coal scales, the benefits of comparison will be just as great as if there was a leak somewhere else.

It may be of interest at this point to refer to the reports of the committee on data of the National Electric Light Association. This committee has been collecting figures on the performance of electric light plants for several years past. The report made at the 1894 convention showed an average performance of 91.7 watt hours per pound of coal, or 8.1 pounds of coal per electrical-horse-power-hour. The 1895 report did not contain so many stations, and those included were of a somewhat better class. The best performance in the latter report was from an incandescent lighting station having direct connected triple expansion condensing engines direct connected to low-pressure incandescent machines, and hand-fired horizontal water tube boilers fed through heaters. The pounds of coal per electrical horse-power hour in this station were 2.8, and 9.37 pounds of water was evaporated per pound of combustible. The coal was hard and soft screenings—half and half. The steam consumption of the engines was 17 pounds per horse-power-hour. This latter figure would be about 15 per cent higher for the electrical horse-power.

GREEN'S PATENT MAKES TROUBLE.

Infringers of the patent granted in 1891 to George F. Green, of Kalamazoo, Mich., on the electric overhead trolley, are being proceeded against by his assignee, Oliver S. Kelley, the millionaire machinery man of Springfield, O., who has retained Butterworth & Dowell, of Washington, D. C., as his attorneys.

That a patent should be granted in 1891 for a device well known for many years preceding seems strange; but is owing to "interference," that proceeding in the patent office which is the attorney's delight. Green actually applied for his patent in 1879, having practically reduced it to practice 4 years earlier, and thereupon came into interference with Edison, Field, VanDepoele, Hall and Siemens.

QUEEN'S HOTEL, MONTREAL.

There are always two matters of vital interest to the convention delegate. One is, how he gets there; the other, what sort of a place will he find in which to rest his weary frame and refresh the inner man. We are glad, therefore, to be able to give a glimpse of the only



B. G. FRAZER-CRIERIE.

fire-proof hotel in Canada, and the one which will be very largely patronized by street railway people.

The Queen's merits special mention among the Montreal hotels. The location is very convenient, both to the two depots and convention and exhibit halls, while the electric cars which pass the door reach all parts of the city. That it is a strictly modern house is evident from

the fact that it was built only two years ago, and the splendid patronage it has at all times is evidence of its good management and popularity. The building is six stories high, and occupies a commanding position at the corner of Windsor and St. James streets. Special attention has been given to details of ventilation, sanitation and plumbing, making it one of the best constructed hotels on the continent. The steps throughout the house are marble; the walls terra cotta; and as the building is



QUEEN'S HOTEL, MONTREAL.

exposed on all four sides light and air are in abundance. The hotel contains handsomely appointed and furnished parlors, diningrooms and bedrooms, detached and en suite, while it is fitted throughout with electric elevators, lights and bells, marble baths, lavatories, etc. The rooms and corridors are large and lofty, and the entrances and offices very imposing. The cuisine, a combination of the excellence of the best English and French chefs, is kept always to the highest standard, and cannot fail to please the most fastidious.

For the further convenience of guests, the service is conducted on both the European and American plans,

while the cafes and restaurants in connection are unsurpassed on the continent.

The manager, B. G. Frazer-Crierie, has had a long and successful experience, and is a popular host who knows how to look well after the comfort of his guests. For the convention a special rate is made of from \$2.50 to \$3 per day, American plan.

WONDERFUL LIGHTNING IN BROOKLYN.

One morning the Chicago papers contained a dispatch from Brooklyn, N. Y., saying that—"Lightning struck a trolley car of the Nassau Railroad company early this morning and nearly all the thirty-three passengers were rendered unconscious by the shock. The electric current also rendered the conductor and motorman helpless. The car was brought to a stop by the bolt, and the next minute flames burst out on the back platform." This is truly a remarkable story for a reporter to build up on the meagre fact that the lightning simply burned out the rear lamp circuit and badly scared a hysterical woman on the car. No passengers were shocked (unless in a nervous way), the motorman (not the lightning) stopped the car, and taken altogether the occurrence was a very commonplace one.

GAS ENGINE PROGRESS IN GERMANY.

The operation of the gas railway at Dessau, Germany, which has been noticed in the REVIEW from time to time, has proved so successful that it has been extended from $2\frac{3}{4}$ to $3\frac{7}{8}$ miles and the rolling stock increased from 9 to 17 cars. The additional capital stock of \$45,000, put out to cover the extensions, was eagerly subscribed by the public.

Gas railways are to be operated in Hirschberg and Saarlouis; and some other towns contemplate adopting the system. Thus, including Dresden, there will soon be four towns having gas railways.

The gas traction patents, which, upon the death of the inventor, Mr. Luhrig, passed into the hands of the Gas Traction Company, London, have been acquired by the Gas Motor Fabrik, Dessau.

Visitors to Dresden riding on the gas cars, which were started over two years ago, must have been made aware of the noxious odor of the exhaust and the disagreeable vibration of the cars. The two difficulties have been hard to overcome. The first proceeded from the partial combustion of the oil used to lubricate the cylinder, and the latter from the inertia of the rapidly reciprocating moving parts of the engine, viz: the piston, piston rod, cross-head and connecting rod. At Dessau it is said these difficulties have been removed so that neither smell nor vibration can be detected.

Accurate measurements have been made of the gas consumed by each car each day and each trip; also of the quantity consumed by the station compressors, which are operated by gas engines. During the first five months of this year the total consumption of gas was 31.2 cubic feet per car mile.

IMPROVEMENTS IN THE STANDARD AIR BRAKES.

Within the last year the Standard Air Brake Company, (formerly Genett Air Brake Company) has made much progress in the perfection of its apparatus. This company was the first to apply air brakes to street cars

reservoir has enough air to make 50 to 100 stops without any air being pumped into it. The reduction of pressure to make a stop is $\frac{1}{4}$ to $\frac{1}{2}$ pound.

Rhyl, Eng., is to have an electric railway, the Urban District Council having offered Dickinson & Co., of Colmore Row, Birmingham, inducements to build.

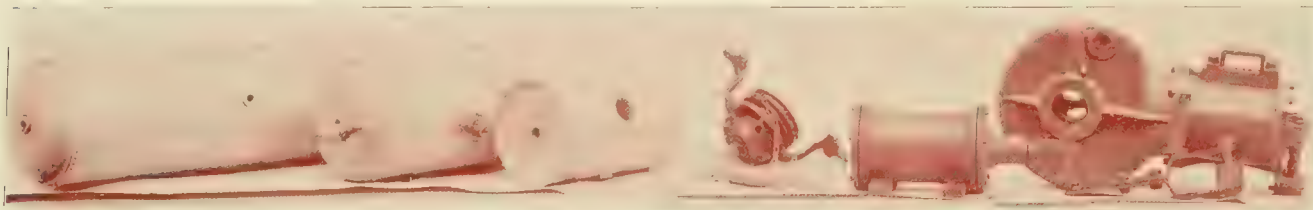


FIG. 2.

and consequently has the advantage that it has carried on exhaustive tests on a large scale, not in the shops but in actual service. This is absolutely necessary to the production of a successful air brake for street cars. Figure 1 gives a suggestion as to size and weight of the air compressor, showing that one man can handle it. This is in marked contrast to the heavier type of compressor which preceded the present one. Figure 2 illustrates the special air reservoirs, brake cylinder, service valve, regulating valve, and compressor with suspension truss. Figure 3 shows the service valve, with air ports, pressure gage, controlling handle, staff casings, stay plates and hose holders. The compressor requires only six inches on the axle against thirteen taken by the former one. Thus it is possible to equip nearly any car now in use. The noise of the pump exhausting into the atmosphere when not at work has been lessened until it is barely noticeable.



FIG. 1.

COMPRESSED AIR SYSTEM IN CHICAGO.

Nearly every system of street car propulsion proposed in modern times has been tried within the last few years in Chicago, except compressed air. Many years have elapsed since it has been tried here but it is to be revived soon. The scene of operations will be the mile of track belonging to the Chicago General Railway on Kedzie avenue between Twenty-second and Thirty-first streets. The compressor will be put in the General Railway electric power house at the south end of this line. The system is that devised by Robert Hardie, of the Rome (N. Y.) Locomotive Works, and briefly mentioned in our May issue. The company which will put it on the Chicago

General is an Illinois organization known as the Compressed Air Motor Company. Louis Walker completed the preliminary arrangements for the trial.



FIG. 3.

Another improvement is the pressure gage under the motorman's handle which shows at all times the pressure in the main reservoir available for braking. The storage

Barcelona, Spain, has organized a street railway company with \$300,000 capital, known as the Compania de Ferrocarriles y Tranvias.



Interesting Bits of Information from all Parts of the Country,
Boiled Down for Busy Readers.

Some country newspaper advocates an increased fare for end seats in open cars.

Boston may have a trolley car ambulance service. The trustees of the City Hospital are investigating.

J. P. Mutter, San Francisco, was arrested for forgery. He cut the time mark in a bogus transfer ticket with his knife.

Thomas Connell, Pottsville, Pa., is constructing two long branch lines for the Schuylkill Electric Railway Company.

J. J. Houghton, Allegheny, Pa., is building 5½ miles of the Knoxville, Fair Haven & Mt. Lebanon Street Railway Company.

Limited cars are run to its park by the Middletown—Goshen Traction Company of Middletown, N. Y. Fares are 10 cents and every person has a seat.

The Columbus Central Street Railway Company, Columbus, O., has closed a contract to carry mail for fourteen offices between Westerville and Columbus.

The opening of the Jasper County Electric Railway at Carthage, Mo., was celebrated with a picnic in which the officials and leading citizens and their wives participated.

Electrically regulated clocks have been placed in all the car houses of the Milwaukee Street Railway Company. Inspectors had considerable trouble with conductors of different lines, as there was a slight variation of time at the different barns.

The National Railway Company, owning the consolidated lines in St. Louis has declared a three-fourths of 1 per cent dividend for the quarter ending October 1, making 6 per cent paid this year. The road earned 7 per cent net; stock is quoted at 110.

Cracksmen made an unsuccessful attempt recently to rob the office safe of the Hammond, Ind., Electric Railway Company. After knocking off the combination knob and drilling several holes into the door, they were evidently frightened away.

George Sleeman, a wealthy brewer of Guelph, Ont., has just completed an electric railway known as the Guelph Electric Railway Company, in that city. He is president, board of directors, manager, secretary, treasurer, sole stockholder, and owns all the bonds.

It was only a horseshoe in the slot, but it tied up an eastern cable road half an hour. The car going full speed struck it, and stopped quicker than any brake could have made it, and there was no skidding of the wheels. The grip mechanism was rendered useless.

Last month a negro pulled the trolley from the wire in the outskirts of an Ohio river city. When the motor-man went back to put it on, the negro snatched his cash box. Robberies of this sort are of frequent occurrence and more precaution should be taken.

The Shafer, Nichols & Watkins Company, New York, is building the Baltimore end of the Columbia & Maryland Electric Railway Company, which will run from Washington to Baltimore. M. F. Talty, Washington, is building the Washington section. Eighty-five pound rail is being used.

The Consumers Electric Light & Street Railway Company, Tampa, Fla., has adopted the near crossing stop. In an advertisement in the local paper it says, "We find it necessary to adopt this rule as it is impossible to give quick service when our cars are obliged to stop five or six times within a block."

Two rival street railways in an Ohio city in competing for fair business employed "barkers." One company's representative was dressed in fanciful costume, and summed up the advantages of his line by shouting, "No dangerous railroad tracks to cross, finely furnished cars, and the conductors miss half the fares."

Heretofore the Great Northern road has run special trains from St. Paul to the state fair grounds at Hamline. This year the manager said, "The Twin City Rapid Transit Company is better able than we to take care of state fair passengers out of St. Paul. So we will let it have the business." Last year the steam road lost money on this service.

Two Boston papers have been discussing the problem of suitable devices for keeping children from jumping on moving cars. One of them, after filling considerable space with descriptions of various plans closes by saying, "The remedy is to be found in stricter home training rather than in public statutes. If parents will allow their boys and girls to run wild they will have to take the consequences." If people are only careful they will not get hurt.

The electric road from Jackson to McArthur, Ohio, is meeting with violent opposition from the steam roads it is to cross. Said steam roads are spending a lot of money raising and lowering grades and putting in switch tracks to annoy the electric road. Wonder if they really think this opposition anything more than a waste of money?

THE CRANE COMPANY.

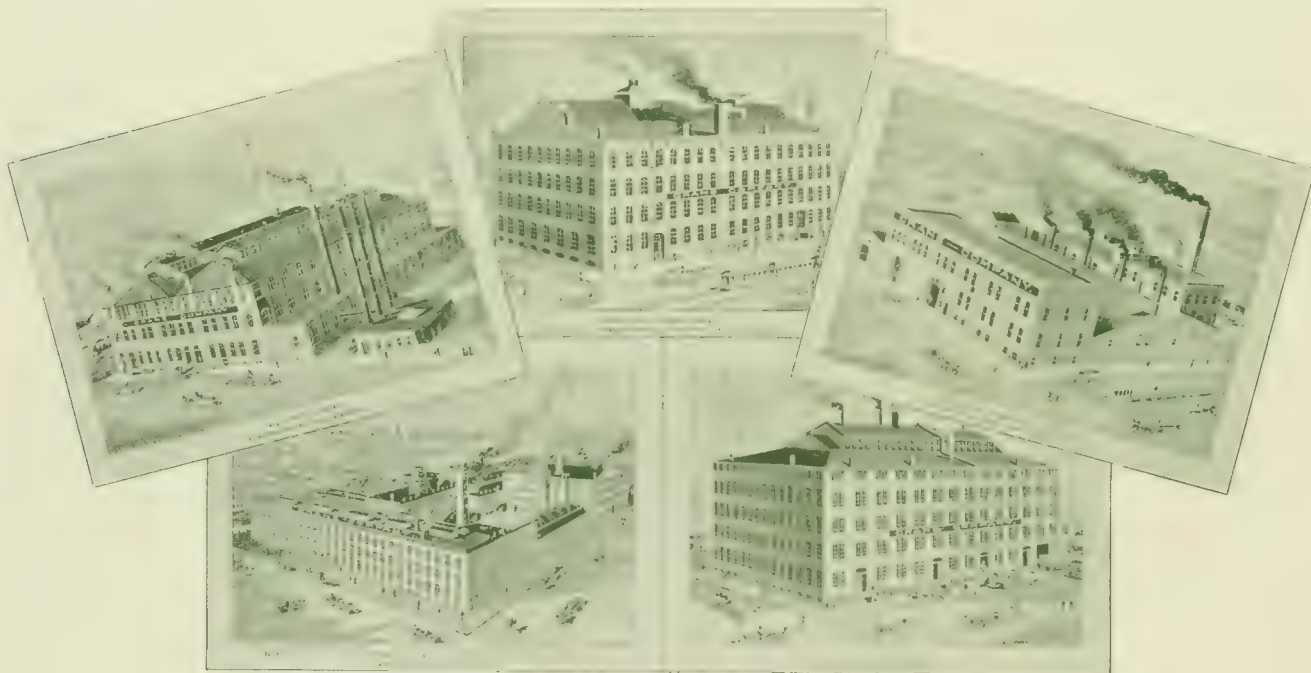
A Wonderful Illustration of Manufacturing Progress.

In this bustling western country, where everything is so brand new that the "Fresh Paint" signs are hardly off the buildings, it is unusual to find a business establishment which has had an existence under one management of well on toward a half century.

In 1855, when stage coaches supplied in the northwest the place of the modern palace cars; when St. Paul was a trading post and Minneapolis not even a name, R. T. Crane followed the Star of Empire westward and located in Chicago. He opened a small brass foundry on the west side, near the present Jefferson street plant of the Crane Company, and in a short time was joined by

It is interesting to note, as illustrating the changes which may take place well within one lifetime, that some of the large cities where the Crane Company now has flourishing branches, were hardly spots on the map when Mr. Crane laid the foundation of the business 40 years ago.

The Crane Company manufactures valves, fittings, wrought iron pipe, water works supplies and air brake appliances—in all, something over seven thousand different articles. Since the demand for higher engine speeds and higher pressures, the company has been paying particular attention to high pressure valves and fittings for street railway and electrical power houses. They have lately sold the Detroit Citizen's Street Railway Company, Los Angeles Traction Company, Minneapolis General



CRANE COMPANY PLANT.

a brother, Charles S. Crane. The business developed rapidly and securely. In 1860 an iron foundry, and in 1864, a wrought iron pipe mill was added to the plant.

In 1865 the buildings on Jefferson and Desplaines streets were erected. In 1886 the expansion of the business necessitated increased facilities, and a large malleable iron foundry was built at Judd street. Three years later another immense building was erected opposite the malleable iron works, for the manufacture of cast iron fittings and iron valves. This plant was thought at the time to be large enough to meet all demands for many years to come, but during this year it has been necessary to run night and day to fill orders.

The growth of the business has kept pace with the marvellous development of the country during the past four decades, and from a small shop employing fewer hands than there are now bill clerks in the general office, it has become the largest establishment manufacturing valves and fittings in the world, with branch houses in all the large cities of the country.

Electric Company, Illinois Steel Company, Edward P. Allis Company (for the West End road, Boston), Kroeschell Bros., Chicago, for the Board of Trade building, and many others. A manufacturing experience covering a great number of years, close attention to detail, and complete facilities, have made the name of the "Crane Company" a guarantee more valuable than any testimonial.

The Buenos Ayres, South America, Grand National Street Railway Company anticipates a profit of \$70,000 for the year, since the gross receipts have been increasing steadily from month to month.

The new electric road at Bristol, England, will be the first one opened in England for some time and the first one built under the new iron clad regulations of the Board of trade. There are a number of interesting features about the road and it can even give American roads some pointers in some respects.

ECONOMICAL EQUIPMENT AND OPERATION OF POWER HOUSE.

PAPER READ BEFORE THE NEW YORK STATE CONVENTION
BY H. S. NEWTON.

A modern electric street railway station, to deserve the name in these advanced days, should embrace in the details of its construction those features which experience has shown to be best adapted to the service required. These details, I take it, are such as would be included by all engineers in a compound-condensing station. A preference has been shown by some engineers for certain additional features, by others for features differing considerably in the means toward the end. It is not my intention to enter into a discussion of the relative merits of different apparatus, or the wisdom of different methods, but I shall confine my remarks to the ways and means which we have considered and have adopted in our power-house lately constructed at Syracuse.

The Syracuse Street Railway Company's plant is made up of three double-compound engines of the upright, marine type, having cylinder dimensions $16\frac{1}{2}$ by 31 inches, with a 24-inch stroke. These are belted direct to multipolar generators of 300-kilowatt capacity, and exhaust each into an independent surface condenser. The condensed steam from the condensers is pumped through an oil filter or separator into a hot well, from which the boiler feed pumps convey it through a pipe heater to the boilers. By this arrangement, not to exceed 10 per cent of the boiler feed-water is taken from the outside water supply, and all difficulty with scale is practically overcome.

The boiler-house contains five 90-inch tubular boilers, 16 feet long, each made up of 118 four-inch tubes. These are fed by a pair of pumps, one acting as a relay to the other. The whole plant has been in operation only a few months, and it has been impossible as yet for us to make an accurate test as to its economy. Our coal and water bills have demonstrated the fact, however, that we are making power at a low rate, and this, with the additional fact that we are having an entire absence of trouble, are all that I can urge as an excuse for this paper.

The feed-water is introduced into the boilers through a line of $2\frac{1}{2}$ -inch piping connected to duplicate pumps through a pipe heater. We have found two objections to hold against the arrangement as adopted, the correcting of which, I feel, will influence somewhat the economy of the station.

The first of these is the fact that in covering the live steam pipes it was not deemed necessary to cover those carrying the warm water to the boilers. This leads to a difference of some five or ten degrees in the temperature of the water when leaving the heater and when entering the boiler, and is, consequently, a source of some little loss.

The second point is the absence (since remedied) from the feed-water line of a check valve beyond the pumps to relieve the check valves at the boilers. This

would seem to be of small importance if not absolutely unnecessary, but we have found it of decided advantage in prolonging the life of the valves and doing away with the rattle occasioned in these valves by the pulsations of the pumps. An air chamber over the pumps is also of prime importance in lending elasticity to the system.

In this connection I wish to call your attention to the importance of an injector on each of the boilers. There seems to be a growing tendency to rely entirely on a relay of pumps, thus allowing the operation of the station to hinge on the efficiency of a piece of apparatus which my experience goes to show has a decided tendency to get out of order.

Concerning the economy of using over and over again for boiler feed the condensed steam from the engine exhausts, a great deal may be said. The surface condenser, the necessary adjunct to this practice, is not a particularly rare piece of apparatus, but I find that a surface condenser which is called upon to perform this one of its functions is decidedly uncommon in street railway practice. In numerous stations it is used to obtain a vacuum, but in very few is the water of condensation utilized. The character of the water around Syracuse made it very desirable that we should utilize the condensed steam if possible, and after what promised to be some very disastrous experience we have at last succeeded and are running very successfully, as mentioned before, with over 90 per cent of our feed from this source.

Our immediate result on starting this practice was oil in the boilers, or a mixture of oil and dark brown sediment, which caked over the bottom seams. We removed this and tried again, concluding that it might be shop grease and dirt. Again we had the same result. Examination of the oil filter showed nothing out of order, and consultation with the engine builders evolved nothing new. After endless experimenting, resulting in a leaky boiler or two, and the consumption of a vast amount of chemicals, we have located and remedied the trouble to our entire satisfaction.

The accumulation noticed seems to have been the result of three causes:

- (1) The use of too much cylinder oil.
- (2) The use of the wrong kind of cylinder oil.
- (3) Insufficient filtration of the oil from the feed-water before going to the boiler.

The first of these causes was, of course, soon remedied, and the old-fashioned notions of our engineers were shocked with the order to use only three drops a minute for each engine.

The second cause we were longer in discovering the remedy for. Various expedients were tried for cutting up the grease in the boilers, such as carbonate of soda, soda ash, tri-sodium phosphate, and lastly, kerosene oil. None of these expedients proved effective, however, and it was not until we changed our cylinder oil that we solved the problem. We purchased some oil of purely mineral stock, which has worked so well as to lead me to conclude that it must have been the animal fat in the

other oil which was doing the mischief. We are using this oil to-day with remarkably good results, never more than a slight film being apparent in the boilers at the time of the weekly cleaning, and this readily succumbing to the action of a half pail full of soda ash pumped in with the feed-water before cooling off.

The third cause of trouble we have recently largely overcome by introducing a number of partitions in our oil filter, by means of which the water is caused to flow alternately over the top of one and under the next, in this way allowing the oil to settle, from its water emulsion, and be collected in the excelsior filling.

The factor that after all has seemed to be the strongest in the solution of our problem in economy is the choice of fuel. We have done quite a good deal of experimenting in this line with various grades of coal, and the results obtained have been such as to lead me to very strong conclusions.

The best coal, and by that I mean the cheapest fuel, we have found to be anthracite buckwheat, costing on board cars at our station, \$2.25 a gross ton. The dust anthracite, I find, will sift through the bars. When mixed with an equal amount of soft coal, it works very well, but necessitates the help of an extra man as mixer, and is not so economically fired. We use 13 tons of buckwheat a day, where it was necessary to use 17 or 18 of the mixture.

A great deal has been written, and a great deal more said about the efficiency of special devices, such as high and low water alarms, automatic damper regulators, etc., in the boiler house. Our experience with them has been most satisfactory. We have found that the less responsibility you place on a man who shovels in your coal, the better off you are in the end; or, in other words, that as compared with human brains, the mechanical device is at a big premium. By making the engineer responsible for the operation of the devices and keeping them in repair, you are insuring yourself a great deal better boiler-house economy that you could not otherwise expect to obtain.

The vertical marine type of engine has given us thus far very good service. The most serious objection that we can urge to them is that they are noisy. In order that the vertical cross-head guides may not be subjected to too serious wear, we have found it necessary to lower the compression below the point usually employed. The natural consequence is more wear in the cross-head crank bearings and more noise. With more compression we get cross-heads and guides, and we consider that we have chosen the lesser of two evils.

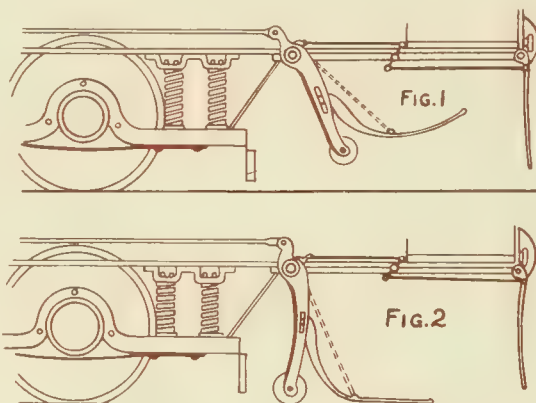
Our engines are provided with piston valves for the high-pressure, and grid-iron slide valves for the low-pressure cylinders. They will govern to within 3 per cent, or about as well as the corliss. I don't think the true importance of good engine government is recognized by street railway men. One is apt to regard a badly governing engine merely as an inconvenience resulting in slower speed on the cars and dim lights. The additional loss of power on the line, viz., in the feed wires,

trolley wires and rail return resulting from the decreased voltage at the station is often entirely lost sight of. A few figures on this point might be interesting. Given a station with generators compounded for a constant potential of 500 volts, with constant speed on the engines and a system of feeders allowing for an average loss on the line of 10 per cent with full load on the machines. With our engines governing perfectly 10 per cent is lost in transmission. If they slow down as the load comes on so that the dynamos show only 450 volts, with the same watt output, over 12 per cent of the total energy will be lost in transmission. With 400 volts on the machine over 15 per cent will be lost. Therefore, when we couple with these facts the consideration of loss of light and decreased efficiency of motors at the lower voltage, it is plain that too much importance cannot be given to the government of prime movers.

In conclusion, I cannot refrain from adding one more voice to the cry against cheap labor in the power-house. What help of that kind we do employ, and we are not extravagant, I assure you, is used in a subordinate capacity. Our present engineer in charge was employed after a very clear demonstration that a cheap man was not capable of handling the plant. A condensing station with the volume of detail which must be always present in its construction, requires brains for its operation; and the man with brains commands good wages. The pressure that is brought to bear on the management for reduction of wages in the power-house is often severe, as I can testify, but the moment the concession is made the trouble begins, and a shutting down for repairs becomes a frequent occurrence.

FROBERG'S FENDER.

The fender invented by R. J. Froberg, of Sacramento, Cal., which he gives to the world, consists of wire netting stretched over a gas pipe frame. Covering the buffer is

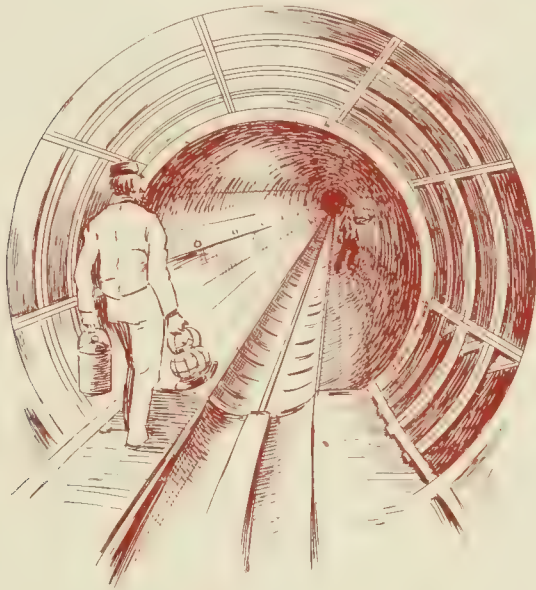


FROBERG'S FENDER.

a series of semicircular springs. Hanging from the dash is a wire apron which, when tripped by the obstruction, lets fall the fender. Normally the net is carried as shown in Fig. 1, and when tripped as in Fig. 2. At the same time that the fender drops the power is shut off and the brake applied automatically.

OLD UNDERGROUND ROAD IN NEW YORK.

Under Broadway, New York, lie the remains of the pioneer underground railway and the only one ever operated as a pneumatic tube. In the construction of this tunnel the cutting shield, now so well known, was invented, and used for the first time. The projectors of the then novel means of transportation planned to build all the way from the Battery to the Harlem river. While in earnest themselves they were laughed at by the people. To convince doubters they built, in 1870, the experimental line under Broadway from Warren to Murray street, one block in length. A car was put in, with the necessary machinery, and everybody was carried free of



FIRST AMERICAN UNDERGROUND ROAD.

charge. Although an apparent success the road, for some reason, was not extended.

The tunnel is still in a good state of preservation, having been substantially built. It is eight feet in diameter, built of brick and circular in section, as shown in the engraving. Under the sidewalk at Warren street was the station, a large, handsome and well lighted room. At the other terminus in City Hall Park was the ventilating shaft, of generous dimensions. The tunnel was 21 feet 6 inches below the street surface, and interfered with no sewers, gas pipes or water mains.

The method of operation was simplicity itself. The car, which ran on a track, fitted the wall of the tunnel so closely that very little air could escape by it at the low pressure employed. Air at a pressure of 5 or 6 pounds to the square inch was admitted behind the car at the Warren street end, blowing it to the opposite end; when the air was exhausted, and the car sucked back, so to speak. As the end of the car, being 8 feet in diameter, had an area of 7,188 square inches it will be seen that the gentle pressure of five pounds per square inch exerted in the aggregate the enormous pressure of 35,940 pounds, equal to a draw bar pull of 18 tons. The power plant consisted of boilers, a 100-horse-power engine and an immense fan.

OBITUARY.

William F. Carleton, of Carleton & Kissam, street car advertisers, died at the Fountain hotel, National Park, on Tuesday, September 16. The remains were taken to Boston in a private car. Mr. Carleton was 48 years of age, and very popular and successful in his business.

A. B. Champion, president of the Wheeling Railway Company, Wheeling, W. Va., died in London, Eng. Mr. Champion was a prominent attorney of Cincinnati, and was a director of several philanthropic institutions. Some time ago he had a severe attack of typhoid fever, and returned to work too soon, which caused a relapse. He went to the Isle of Wight in search of health and there died of bronchial asthma.

It is with deep regret the many friends of Col. W. H. Sinclair, of Galveston, will learn of the death of his wife, which occurred on August 15. She went to Texas with her husband 25 years ago, and by her many charming qualities and active participation in charitable work had won a large circle of friends. Mrs. Sinclair also entered with unusual ability and energy into all of her husband's enterprises and shared his successes.

G. P. Kingsbury, the well known street railway superintendent, passed away September 12. His street railway career was begun as superintendent of the Muskegon Railway, of Muskegon, Mich., at which place he had formerly been in telegraph work. In 1891 he went to West Superior, Wis., and was superintendent of the West Superior Rapid Transit Company until 1893, when his health made a milder climate necessary and he went to California as superintendent of the Sacramento Electric Railway. He returned to Muskegon in 1894. He died of paralysis brought on by an accident some years ago on the Muskegon Railway, his health having been poor for several years.

TO CARRY ON AN EXPRESS BUSINESS.

There has been recently incorporated in Massachusetts the Boston & Suburban Express Company which has secured a broad charter. If it can secure the contracts with the street railway companies and the government, the new company will carry on an extensive business in handling freight and express on the various lines of street railway in the state. This is a new feature of the express and freight service idea for street railways, and may have some of the disadvantages that have been brought out by certain contracts leasing the advertising privileges of cars to outsiders.

F. D. Le Bar, superintendent of the Middletown-Goshen Traction Company, Middletown, N. Y., has resigned to become superintendent of the Rockwell Construction Company. Oscar G. C. Urban, electrician of the company, has succeeded him.

NEW FEATURES ON THE CALUMET.

In some respects the Calumet Electric Railway of Chicago occupies a unique position among electric railways. It covers an immense territory in the southern part of the city. This part of Chicago, naturally a low marshy plain, has no attractions for suburban residences for those doing business in the city, but has a number of



EMERGENCY CAR.

important manufacturing villages built up by virtue of the cheap land and good shipping facilities. It is therefore dependent for its regular travel on the working people scattered over its territory. Last year the great Pullman strike had its center in the Calumet's territory and thousands of workmen were brought to such straits that the regular travel on the road has fallen off greatly the last year. When the present superintendent, E. D. Du Bois, took charge of the road last March the outlook was very unpromising. Even with the previous year's traffic the finances were running behind and there seemed to be a good chance for a bigger deficit this year than formerly. Two distinct problems presented themselves. One was to cut down the operating expenses and the other was to induce enough travel to make up for the loss of regular patronage. Both of these problems were solved so successfully that the balance is now on the right side of the

books. The operating expenses were cut down, mainly by stopping various leaks which were found to exist in the several departments.

The problem of induced travel is the one which was, perhaps, the most difficult of the two, and the one of which we will explain the solution, as many roads will be able to profit thereby. To the thousands of people living in the thickly settled south side north of Sixty-fourth street the Calumet road affords the easiest means of getting a breath of fresh country air. However, very few people who were within reach of the road realized what a pleasant means of recreation it was and the road had to be brought to the attention of the public. Advertising by means of circulars was begun on a large scale in June. The effects of this advertising was felt, not immediately, but during the following two months. One of the things advertised extensively is a 26-mile ride for 10 cents.

This is, of course, carrying people very cheap, but as it can be done at high speed, with long distances between stops, it is not as expensive an operation as on city roads. The fast ride across the cool prairies is now becoming a very popular thing among south side people.

Gardner's park, at the southern terminus, was also well advertised, and numerous picnic parties have poured their nickels into the coffers of the company. Recently the trolley party fad has been well taken advantage of. This road has done by far the greater part of the trolley party business in Chicago this year. This is partly because the road has so great a mileage through the open country, but is mainly because this kind of business was well advertised and catered to. Several open cars have been carpeted and decorated with colored lamps and striped bunting. The average is more than two parties a night. Those who have gone once are sure to go again soon, and so the business grows rapidly. One party has gone several times this summer. Mr. Du Bois does not intend to let this class of business slip from him entirely when winter comes, so some cars for winter parties will be prepared. Some of the summer customers



TOWER CAR.



FOR TROLLEY PARTIES.

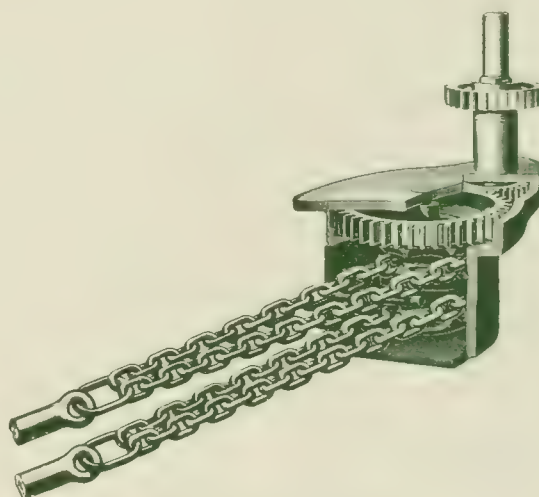
have already signified their intention to patronize the winter car. One feature of the winter trolley party service will probably be a dining car. The moonlight ride across the country is expected to be one of the drawing cards for winter parties. A dance and refreshment hall is made out of the waiting room at West Pullman when trolley parties come down that desire to use it.

Another feature tried in Chicago for the first time is the funeral train. At one of the northern termini is Oakwoods cemetery, the burying ground for nearly all the south side. The distance from South Chicago, Pullman and West Pullman is so great, and the roads are so bad in many places, that the custom of using the electric cars for funeral parties has almost become the rule rather than the exception. The funeral train consists of two or three cars draped in black. The motor car carries the coffin and pall bearers, and is an open car with the seat backs removed. The following cars carry the friends and relatives. At the cemetery gate a small hand cart is brought for the coffin. The funeral train returns to the gate at whatever time specified to take the party back to the starting point or elsewhere, as desired.

The same local conditions which make the funeral trains a success also make advisable the use of cars instead of wagons for emergency wrecking calls, and for much of the line work, especially as such cars were made from old motor cars which were going to waste. Quick work with a wagon is impossible in the Calumet territory. The wrecking car is a short box car on a McGuire truck fitted with an old Rae motor. The car has a full outfit of wrecking tools and repair parts. It is kept standing in front of the car barns night and day, with a crew ready to run it. It has some of the field windings on the motor cut out so that it easily makes 30 miles an hour at full speed. Side by side with this car stands a tower car for line work. It was made over from a similar old car, and, being much more stable and roomy than a wagon, facilitates line work greatly. All of the line tools are kept on this car. Its motor is also wound for high speed.

STERLING SAFETY BRAKE.

A simple but very effective improvement on the common chain and brake staff arrangement is being offered by the Sterling Supply & Manufacturing Company of 97 Bank street, New York. It is the invention of Thomas Millen, master mechanic of the Broadway cable line of



STERLING SAFETY BRAKE.

that city. The engraving makes plain the principle, and operation of the device. The staff carries at its lower end a steel pinion which meshes into a steel gear with a ratio of two and a half to one. The gear wheel carries on its axle two sprockets around which the chains wind, two being provided for safety. The leverage on the chain is $2\frac{1}{2}$ times that with the ordinary arrangement and the brake levers are shortened about one-half. The arrangement permits the brake to be adjusted so that it can be drawn up with less handle movement than the ordinary staff. With the adjustment used on the Broadway road, the handle it is said, only has to be moved half a turn to make an emergency stop.

A MAN OF ALL WORK ELECTRIC LOCOMOTIVE.

The queerest combination in the way of an electric locomotive that was ever put on wheels is running on a narrow gage road at St. Mary's barracks, at Chatham, Eng. It was designed primarily to conduct military operations (or to give vent to the inventive genius of the electrical



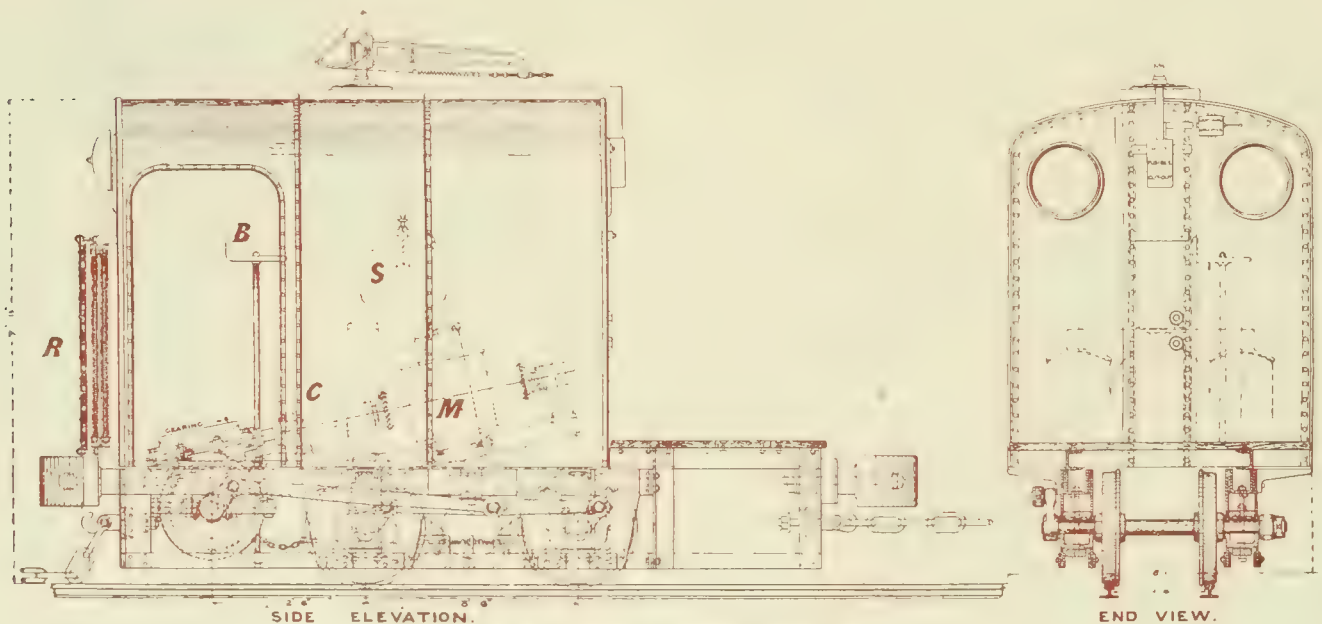
MAN OF ALL WORK ELECTRIC LOCOMOTIVE

school students; probably a little of both.) At any rate it is a novel and ingenious piece of apparatus. As the gage of the road is only 18 inches the designers had decidedly little room in which to work. It had to be heavy enough to give it traction to start fully loaded on a 5 per cent grade, the center of gravity had to be low on account of the narrow gage and the wheel base had

intended to have two of these machines act as one and carry a load of artillery between them, resting on the platforms. At other times each truck will be independent. The driving is by worm gear and connecting rods. The object of slightly tilting the motor as shown in the elevation is to keep the connecting rods as nearly horizontal as possible. The drive wheels are 22-inch and the wheel base $3\frac{1}{2}$ feet. The worm gear is connected to the motor by a coupling which is disconnected when the motor is to run as a transformer for the searchlight in the cab. The power plant supplying it is of interest as being the first direct connected electric railway station in England, in spite of an English electrical paper's remark some time ago that this is a practice that English engineers fell in with long ago. The engravings are from an article by R. W. Weeks in the London Electrical Engineer.

THE ELECTRO MAGNETIC TRACTION COMPANY SYSTEM.

The Electro Magnetic Traction Company of Philadelphia is exploiting a system designed to occupy the same field as the underground conduit at less expense. The current is supplied to the car through a third rail in the middle of the track. This rail is in sections 11 feet long and only two sections are alive at any one time. The rail is laid in the paving but supported on a stringer of creosoted wood. The sections are one foot apart at the ends. The cutting in and out of these sections is accomplished by magnets carried on the car which act on switches in the junction boxes along the track. These junction box switches connect the third rail sections as



MAN OF ALL WORK ELECTRIC LOCOMOTIVE

to be short to round short curves. More than this the motor had to be built so that it could serve as a constant current transformer to reduce the trolley current of 400 volts to 80 volts, to run a searchlight. It will be noticed that on one end of the locomotive is a platform. It is

the car goes with a continuous insulated conductor running along the tracks above the ties. The pressure used is 500-volts and the inventors anticipate no trouble as to insulation because of the shortness of the third rail sections,—only 22 feet being in at a time. The magnets for

closing and opening junction box switches are energized normally from the third rail. To provide for cases where the supply from the power house is momentarily cut off and the car gets over a dead section of rail with no means of closing the switch to make it live, a small storage battery is put on the car and connected to an auxiliary circuit on the car magnets. The regular operation of the car is as follows. When the forward end of the car passes onto a new section the magnets on that end of the car pass over a junction box and close its switch. When the trolley running on the third rail has left the rear section the magnet on the rear of the car opens the junction box switch, and so on indefinitely. The company is composed of well-known Philadelphians. J. F. McLaughlin is the chief engineer and inventor assisted by J. W. Darley.

IS A FREIGHT OR MAIL SERVICE PROFITABLE OR UNPROFITABLE ON STREET RAILWAYS?

PAPER BY BENJAMIN NORTON, READ BEFORE THE NEW YORK STATE STREET RAILWAY CONVENTION.

The simplest answer to this question is: Yes, if it can be performed at profit; and No, if it must be performed at a loss. Now, apparently the question is solved, and I have no further need to discuss it. But as this is a subject which will eventually be taken up seriously by most electric railway companies, it is worthy of very careful consideration.

On a street railway which has no suburban outlet and no direct or close connection with some other line which operates or can conveniently operate a freight service, it might be a very unprofitable venture to undertake this class of traffic. To-day, however, there is hardly an electric railway (and we will speak of electric roads only now, since horse power is a thing of the past,) which does not have suburban outlets or chances for them. Therefore, we may safely say that a freight service, as a general rule, ought to pay. Very few companies thus far have branched out into this field, and as I happen to be interested heavily in a line which has gone vigorously into the matter, I can tell briefly our experience and can show you what a successful feature of our business the freight branch of it is; so much so, that we have a regularly organized freight department, waybilling merchandise in regular steam railway fashion and running regularly scheduled freight trains, which pay handsomely.

This line grew out of a tumble-down horse railway in Newburgh, and after being rebuilt and extended and equipped electrically, found ourselves tapping the rich Walkill Valley at Walden, 12 miles away, and terminating at the front door of one of the largest cutlery works in this country, running by all the stores and shops in the town, and giving an opportunity besides to dairymen of Orange County to get their milk, butter and cheese to boats on the Hudson River at Newburgh inside of an hour, when formerly they had carted it the whole distance over

rough country roads, the teamsters spending pretty much the day at it and returning home at night, with their mule team tired out and often a broken-down wagon.

This line to-day, because it is a short cut in the first place, and because goods can be transported at low rates in the second place, is handling the dry goods and other merchandise for Walden merchants, shipped from New York to Newburgh by boat; the raw material for the cutlery works in the way of steel, brass, wood, and other supplies, and bringing back manufactured material in cases; hay, straw and fruit, and condensed milk in cans from the Borden condensery, only two miles from our terminus at Walden. The road runs along the highway in some portions, and at other points the line is set well back from the roadway on independent property; and the farmers hustle their hay and straw in bales out the side gate to the track and stop the freight car handily, saving, besides 50 cents to \$1 per ton freight, a long drive to the steam road, freight house. In August, the operating cost for handling our freight was a trifle over 40 per cent of the gross receipts. We ran three motor freight cars, carrying from eight to 12 tons each, and four flat or gondola cars as trailers, carrying from six to eight tons each. At Newburgh the line runs alongside the string-piece of the steamboat dock, so that everything can be easily skidded between the boats and cars. We also run close to the Erie & West Shore freight houses and tracks, ensuring an all-year-round New York connection, although, as a rule, the Ramsdell line of boats is out of service but one month in the year.

Some of our Walden friends remarked the other day that the Walkill Valley Railway people had "soured on the trolley," because their freight trains in both directions were running through Walden without stopping, and they were discussing the notion of discharging their freight agent at that point. I may add that during the past week we have hauled from Walden to the Hudson River, among other kinds of freight, about 75 tons of grapes, and the coming week we will do the same. The rate of 13 cents per hundred pounds net to us makes \$2.60 a ton, which is a good rate, and requires but one trip per day of a motor freight car and trailer to get it. To earn the same amount of money with passengers would take the entire day and a regular full day crew besides.

The experiments now being made by the New Haven Railway people on their Nantasket Beach road are probably not new to you, and it looks very much as though freight business on electric roads would not only be profitable in the near future, but generally adopted as a means of revenue by a large percentage of such companies.

As to mail contracts, while the government compensation is comparatively small, the actual cost to a company for performing the service is so little that they must be profitable to a certain extent; but aside from this no large corporation in a large city where the circumstances call for such a contract, should overlook the special safeguard in time of strikes. During my presidency of the

Atlantic Avenue railway in Brooklyn, we undertook to serve the government in this regard and prepared special mail cars. A portion of each of these cars was devoted to mail matter and mail clerks and a portion to regular passengers, so that while they were running they were earning money for the company from the passengers, same as other cars, while the sign "U. S. Mail" always insured a clear track. The 19 cars on our Fifth avenue line which under the contract were permitted to carry the legend "U. S. Mail" were not molested and we were able to keep that particular line open throughout the trouble. In view of all the circumstances I believe a mail contract for a street railway is one of the most profitable things, for a small one, they can undertake.

CROSSING FIGHT NEAR CONEY ISLAND.

There was a pretty crossing fight last month on Long Island between the forces of the Nassau Electric Railroad Company, and the Long Island and the New York, Brooklyn & Manhattan Beach Railroad companies, in which the electric road came out on top. For years the two steam roads have had a monopoly of the immense passenger traffic from Brooklyn and New York to Manhattan Beach, Brighton and Coney Island, the three pleasure resorts that attract more people than any other resorts in the world. The Nassau Electric Railroad Company, which is owned by the P. H. Flynn syndicate, was built to secure a portion of this traffic, while incidentally it would have the effect of bringing down rates on steam roads.



OUTWITTED A STEAM ROAD.

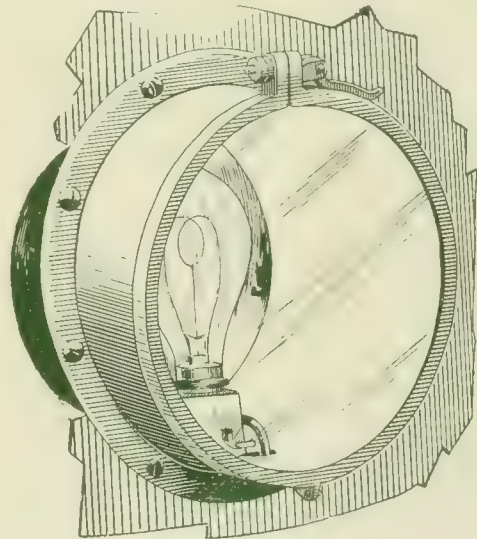
The Nassau company has several lines but it was not until September 22 that the company had its line completed that will be the means of enabling the poorer classes to enjoy the cool ocean breezes on hot nights without paying a day's wages for railroad fare.

It was evening when the Nassau Company tried to make the crossing, having failed in the afternoon to obtain an injunction. The steam roads had four locomotives on the scene, but in some way the electric company managed to get a wagon load of rails on the track and unhitched the horses. While the steam road crews

were working to remove the wagon, the electric track gang succeeded in laying a temporary crossing and ran a car over the steamtracks. The next day it carried 12,000 passengers on the new line.

NEAL ELECTRIC HEADLIGHT.

The headlight which is here illustrated is fast superseding the oil lamp in Boston and elsewhere. It is very simple, consisting of a single incandescent electric lamp within the reflector. The outside is malleable iron, has a double thick glass cover and projects only 3 1/2 inches out from the dash. It is sold by the Consolidated Railway Supply Company, of Boston, Mass. C. F. Baker, master mechanic of the West End Street Railway Com-



NEAL ELECTRIC HEADLIGHT.

pany, which has 500 cars equipped with this headlight, says, "There are several advantages of the electric over the oil lamp. It is a better light. It does away with the cost of labor for cleaning and filling lamps and getting them out on the street ready for night cars. It abolishes the kerosene around our car houses, therefore decreasing the liability from fire and lowering insurance rates. As to the cost of maintenance the advantage of the electric over the oil lamp is so great that there is practically no comparison."

TRAFFIC AT PHILADELPHIA.

The Electric Traction Company carried 58,125,481 passengers during the 12 months ending June, 1895, earned \$2,151,853 and expended \$1,241,583. The company has \$7,619,800 paid capital, \$301,110 funded debt, 130 miles of road, 559 electric and 3 horse cars. Compared with the preceding 12 months the number of passengers increased 17,085,133 and the gross receipts \$251,246.

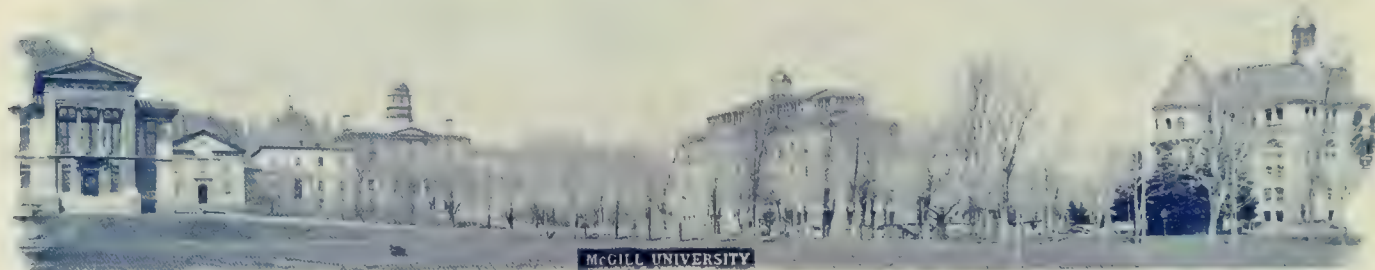
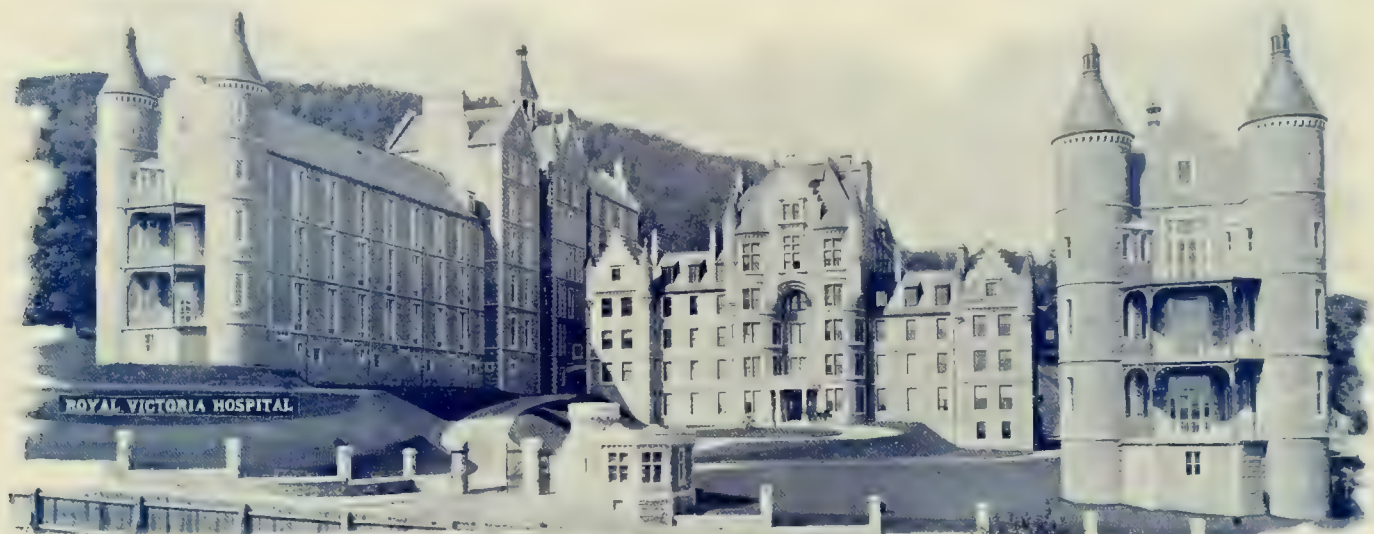
The People's Traction Company has \$750,000 paid common and \$24,000 paid preferred stock, \$750,000 funded debt, 577 electric and 14 horse cars. On a traffic of 44,927,760 passengers the earnings were \$1,660,675 and expenses \$1,390,406.

MONTREAL ENTERTAINMENTS.

At this writing it has not been definitely settled, what entertainments will be provided for the visiting delegates of the American Street Railway Association at Montreal. Nor has the program been arranged, but it is certain that the famous bump of hospitality of the citizens of Montreal will provide bountifully for their guests. The sessions of the convention will occupy Tuesday, Wednesday,

The Montreal Park & Island Railway Company also invites delegates to visit its lines.

Another afternoon will be devoted to a visit to the McGill university, which has a famous testing laboratory, that will be open to the street railway men. Near by is Royal Victoria Hospital the gift to the city by Lord Mount Stephen and Sir Donald Smith, who each contributed \$1,000,000. Lord Mount Stephen made his money as a railroad contractor, while Sir Donald Smith



ROYAL VICTORIA HOSPITAL.—M'GILL UNIVERSITY MONTREAL COLLEGE

day, Thursday and Friday mornings, leaving the afternoons and evenings free for a good time.

It is understood that one afternoon the city of Montreal will be the hosts, giving the visitors a carriage ride around the city and entertaining them at luncheon.

Another afternoon will be passed in an inspection of the power house, repair shops, car houses and a trip over the lines of the Montreal Street Railway Company.

is an officer of the Hudson Bay Company, and president of the Bank of Montreal. He has the finest private art gallery in the Dominion, to which delegates will be invited, if Sir Donald returns from Europe before the day set for the convention.

Montreal College, which is shown in the illustration is another famous institution of learning. The two stone towers that appear in the foreground were

built two hundred years ago as a protection from the Indians.

Mr. Cuninghame will arrange, if possible, for a trip some afternoon to Lachine. Here the party will board a steamer and shoot Lachine rapids, the most dangerous in the St. Lawrence. A few years ago the steamers used to lay to opposite an Indian village to take aboard an old Indian pilot painted up to show his good looks, who came from the shore in a canoe. When he grasped the wheel, the engineer was given the starting signal and the steamer would proceed, while the passengers held their breath, appalled by the thought of striking a rock, which

11. Montreal College.
12. McGill University.
13. Royal Victoria Hospital.
14. Hotel Dieu Hospital.
15. Exposition Grounds. Temporary Power House, Montreal Park and Island Road.

ROUTE TO MONTREAL.

The best way to go to Montreal is by the way of the Lake Shore and New York Central Railroads. It is unnecessary to bring evidence to prove that the roadbeds of these two companies are the finest in the world, for everybody knows that to be a fact. Aside from this important feature of good road bed, an easy and rapid running train, a traveler to a convention wants to be sure that he is going to have a good crowd of fellows for companions. This is already certain, for enough berths have been secured to insure the running of special cars over these famous routes. The party that will leave Chicago at 10:30 Sunday morning, October 13, will arrive at Toledo at 4:45 p. m., Cleveland 7:35 p. m., Ashtabula 8:54 p. m., Erie 9:54 p. m., Buffalo 12:10 a. m. At these stations the party will be joined by delegates from intermediate points. From Utica the route will be by daylight over the New York Central through the beautiful scenery of the Adirondacks. The train will arrive at Montreal 3 p. m.,

Monday, at the new Windsor street station of the Canadian Pacific. This station is a fine piece of architectural work and cost \$700,000. Berths and tickets can be reserved by addressing C. K. Wilber, W. P. A., Lake Shore & Michigan Southern R. R., Chicago. The train



meant sure death. Since the old Indian's death, the pilot or rather two are taken on at Lachine. The most interesting part of the trip is to watch the pilots as the boat goes through the rapids. Each seems to know intuitively what to do, and their co-operation is marvelous.

It has not been definitely decided, whether the Montreal Hunt Club will show the visitors how to chase a fox among the woods of Mount Royal or not. Should this treat be forthcoming there are many street railway managers who can enter into it as experts.

The banquet is to be the crowning feature of the round of pleasure. The local committee is spreading itself, and promises something in the way of a menu that is different from anything that is served on this side of the line.

The map of the city of Montreal shows the lines of the Montreal Street Railway together with several points of interest.

1. Convention and Exhibit Halls.
2. Queen's Hotel
3. Canadian Pacific depot, where Lake Shore special arrives.
4. St. James Cathedral and Y. M. C. A.
5. Repair shops, Montreal Street Railway.
6. City Hall, Court House. Old Governor's Mansion, where French-English treaty is supposed to have been signed.
7. Grand Trunk depot.
8. Notre Dame Parish church.
9. Power House, Montreal Street Railway.
10. Grey Nunnery.



CANADIAN PACIFIC DEPOT, MONTREAL.

will afford every convenience known to modern travel, and the trip cannot fail to be one of the most delightful ever made to a convention.

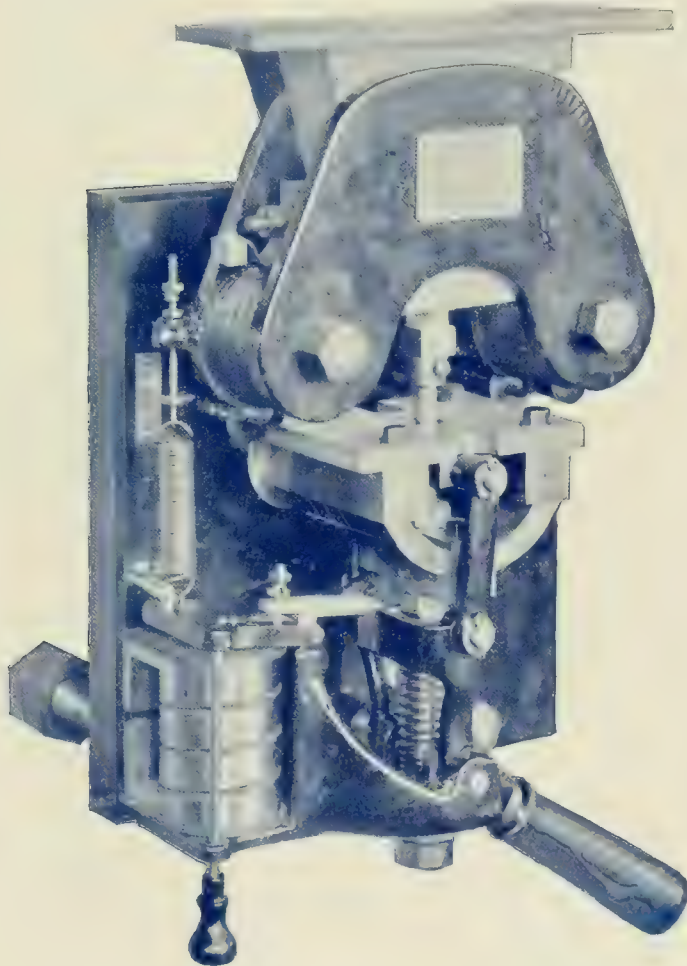
To reach the Queen's Hotel turn to the right from the depot and walk a block and a half. To reach the convention hall turn to the left from the depot and walk a block

and a half. Train will arrive soon enough to permit supply men to do considerable work in getting into shape for Tuesday.

At the Canadian boundary line a customs inspector will come aboard the train to examine the baggage. Trunks and grips will have to be opened for his inspection. On the return trip trunks will be examined at the depot before they are checked, while hand baggage is not examined until the border. The United States Consul at Montreal says anything new will be passed free of duty, if the owner can prove that it was bought as a necessity for his comfort. Of course a new fur coat will not be passed in July. The persons of passengers are never searched.

GENERAL ELECTRIC "K" CIRCUIT BREAKER.

The "K" circuit breaker of the General Electric Company, now in use on all railway generator and feeder panels furnished by that company is very elaborately



worked out to meet the demand for something that will open a heavy 500-volt circuit without soon destroying itself. In principle it is as follows: The total current of the generator or feeder passes through the large vertical magnet and across a bridge of flexible copper strips, which bridge is normally locked in contact with the con-

ducting studs of the breaker. The magnet acts upon a lever to trip this lock and a heavy spiral spring pulls away the bridge when freed by the action of the magnet. Opposed to the armature trip lever of the magnet is a tension spring which is carefully graduated by test and can be so set as to allow the armature to trip only at a definite magnet pull; this pull depends directly on the amperes in the circuit and the scale reading of the spring is consequently marked in amperes. The tripping tension can be varied in a given instrument through a considerable range and thus the breaker be adapted to various requirements. When a current of several hundred or several thousand amperes at 600 volts is broken, a very considerable amount of heat energy results. In most circuit breakers this energy expends itself on the main or on supplementary carbon contacts which must be frequently replaced by reason of the fusing or burning. In the "K" however, the main or bridge contacts are shunted by the windings of a pair of small magnets the poles of which enclose a chute containing supplementary contact points; these supplementary contacts break the circuit just after the main contacts have separated. When the latch trips, the main bridge drops forcing the whole current to pass through the small magnets. This results in the creation of an intense magnetic field between their poles. In this field the supplementary contacts then open, the magnetism instantly blowing out the resulting arc without damage to the contacts themselves.

LOCOMOTIVE ENGINEERS CONSIDER ELECTRICITY.

That the great majority of steam road men do not shut their eyes to the future possibilities of the electric motor on the steam road, but consider the matter much as conservative electrical engineers do, after all is shown by the following which is a quotation from President C. B. Conger of the Traveling Locomotive Engineers' Association at the last annual convention at Pittsburg. In his opening address he said:—

"There is some discussion among the men in the operating departments of railroads in regard to the use of electricity as the future motive power, but it does not seem likely that many regular trains will be run by it during the coming year except on suburban passenger railways, where large numbers of short passenger trains are handled. The success of the large motor used by the Baltimore and Ohio for handling heavy trains through the Baltimore tunnel shows that these motors can be made to do the heaviest kind of work, while other tests have demonstrated the speed of heavy passenger motors. Such being the state of development, we may find it necessary before long to begin to acquire a detailed knowledge of the operating of electric motors in all their particulars, as we are now skilled in the operation of the steam engine. Although this matter is a question of the future, yet we will be compelled to meet it some day."



Bowers Bros., of Chicago, are enjoying a good demand right along for their mica and copper commutator segments.

The John A. Roebling's Sons Company, of Chicago, reports business as first-rate in all kinds of electrical wire and wire rope.

The Chicago office of the General Electric has just sold to the Chicago City Railway motor equipments for 30 new cars now building.

The Walker Manufacturing Company, has taken a large space at the Montreal exhibit hall and will have a display, which will be unusually interesting.

The Gisholt Machine Company, of Madison, Wis., has issued a catalog illustrating the possibilities of its turret lathes and the economy of a universal tool grinder.

N. A. Christensen, formerly connected with air-brake work in Chicago, now in the employ of the Allis Company, Milwaukee, has placed two trial air-brakes on cars there.

The Edward P. Allis Company, of Milwaukee, Wis., is running its shops to their fullest capacity on a large quantity of heavy work, including the Reynolds-Corliss engines.

Peter Malcolm, Saginaw, Mich., secured the contract for constructing the Inter-Urban road. Washburn & Moen will supply the wire, and the Illinois Steel Company the rails.

Berlin Iron Bridge Company, East Berlin, Conn., has completed for the New Haven Street Railway a car-house, 86 by 188 feet. The construction is fire-proof, the roof being slate.

John W. Meaker, president of the Meaker Manufacturing Company, North Chicago, will show a full line of registers at Montreal, having secured one of the best spaces in the hall.

Scarritt Furniture Company will have an interesting display at the convention, as it always does, which will be in charge of General Managers Scarritt, and H. O. Nourse, of Chicago.

The Washburn & Moen Manufacturing Company, of Worcester, Mass., reports business very good, with an excellent demand for its product. The greatest trouble is to get raw material.

The Meaker Manufacturing Company, North Chicago, Ill., manufacturers of the Meaker fare registers, announces that it will distribute at the Montreal convention the finest register catalog ever published.

The Simonds Manufacturing Company, of Pittsburg, Pa., has issued a brief catalog of its few but select specialties; gears, pinions, trolley wheels, harps and bases, including the well known Duncan trolley.

The Ohio Brass Company, Mansfield, O., will not take a brass furnace along, but will have such a complete display of overhead fixtures and other specialties a manager can almost stock his road out of the exhibit.

The Taylor Electric Truck Company, Albany, was the first truck builder to secure space at the Montreal convention. A full line of trucks will be shown, and Mr. Taylor himself will be present in charge of the exhibit.

The Phoenix Carbon Manufacturing Company, St. Louis, received an order, August 20, from the West End Street Railway, Boston, for 25,000 carbon brushes. Since their delivery the West End Company has ordered 30,000 additional.

The Fitzgerald-Van Dorn Company, Chicago, has received the contract for equipping the cars of the Lake Street Elevated Road with its automatic drawbars. Orders for the equipment of 15 electric street railways with this device have been received the last two months.

Fenders and wheel-guards will be the specialty of the Empire Manufacturing Company, recently organized at Portland, Me., with G. E. Hogan, of Lawrence, Mass., president, and John J. Cummings, of the same place, treasurer. Of the \$100,000 capital, \$500 has been paid in.

A. L. Ide & Son, Springfield, Ill., have had specially made for them, an artistic and elegant playing card, a pack of which will be sent to every address on receipt of ten cents. The back of each card is adorned with four views of Ideal engines, making an attractive and useful souvenir.

The Indiana Rubber & Insulated Wire Company, of Marion, Ind., is snowed under with orders for Paranite and other insulated wire. R. E. Lucas has succeeded C. J. Butler as secretary of the company. The latter will go with the Peoria Rubber & Manufacturing Company, Peoria Ill.

The Griffin Wheel Company, of Chicago, has just completed an addition to its car wheel foundry, increasing the capacity one-third, made necessary by the steadily increasing demand for its wheels, and is just completing a new car wheel foundry at Denver, Colo., which will be in operation early in October.



The E. T. Burrowes Company, Portland, Me., will show at Montreal, besides an attractive general line of car curtains, a new automatic shade especially adapted for open cars; also its regular patent curtain for closed cars. A full line of Oakette waterproof curtain material will be shown; H. H. Russell will be in charge.

The Charles Scott Spring Company, will attend the Montreal convention with a very attractive display of the latest in all types of steel springs, and the progressive manager will want to see them, too. The spring cuts an item in easy riding and in repairs of car, track and motor which was never so thoroughly realized as now.

The Fitzgerald-Van Dorn Company, will be represented at Montreal by Vice President Van Dorn who will have an interesting exhibit in the rink, but who will have what is better, a working exhibit of the Van Dorn coupler as they have been adopted on the Montreal, Park and Island Railway where they are giving good satisfaction.

St. Louis always turns out a good delegation to conventions, and this year will be no exception. Among others from that city will be the gentlemen in charge of the exhibits of the St. Louis Register Company who have taken a large space in Victoria rink and will make their registers heard and known throughout the length and breadth of the hall.

Eugene Munsell & Co., New York, are sending a novelty to their friends, which is a sample of the stamped solid sheet mica segments, manufactured by the firm. It is designed to be hung up as a constant reminder of where to go for mica segments. The firm has recently put in three additional presses, and has added 2,600 square feet to its plant.

The Okonite Company (limited) makes a specialty of feeder wires for street railway use. They are tough and tenacious, and are not affected by extreme changes in temperature. Okonite has made an enviable record, both in this country and abroad, and is deservedly the most popular insulation known to the electrical fraternity. It is strictly high-grade, and "never disappoints."

The board of appeals of the United States Patent Office has just reversed the decision of the primary examiner and has granted the right to protection upon what is appropriately and conveniently termed "Flexible Mica" for insulation, recently introduced by the Mica Insulator Company, of 213 Water St., New York City. Edward P. Thompson, of New York appeared for appellant.

The Westinghouse Machine Company, of Pittsburg, Pa., has acquired the American patent rights of the Parsons steam turbine, a European invention. While rotary steam motors are, as a rule, wasteful, the Parsons turbine is said to be an exception, having shown a remarkable efficiency. Being capable of high speed the turbine should prove highly useful for driving direct connected generators.

What is probably the most complete exclusively vise catalogue issued, is that of the Prentiss Vise Company, 44 Barclay street, New York. It includes not only all the old standard styles but the latest types as well, in every line of bench and shop work. There are several vises specially adapted to street railway uses and managers will find the catalogue suggestive and useful. Sent free on application.

The Metropolitan Electric Company, of Chicago, finds that its N. I. R. wire is still holding its own with the street railway trade. Recently an order was secured for 12 miles of No. 6 wire after submitting to a trial of merits in competition with other makes on the market. P & B insulating compound is in good demand and the Metropolitan incandescent lamp for railway use is more than meeting expectations.

Kohler Bros., of Chicago, have contracted to furnish the St. Louis & Meramec River Railroad, St. Louis, Mo., with two 300 kilowatt direct-connected Walker generators, ten double 30 horse-power and ten double 50 horse-power car equipments, made by the Walker Manufacturing Company, of Cleveland, O. Kohler Bros. will also furnish three Walker equipments for use on the Lake Street Elevated Railroad, Chicago.

The Trump Manufacturing Company, Springfield, O., has absorbed what remained of the W. C. Leffel Water Wheel Company, and with a capital stock of \$100,000 will proceed to build the Fuller Trump Wheel. Under the re-organization John J. Hoppes takes a large share of the stock, \$50,000 it is said, and becomes president. Fuller Trump is general manager; Paul A. Stanley treasurer; and Percy Norton, secretary.

The R. A. Crawford Manufacturing Company, of Philadelphia, reports an immense business in their street-car fenders, having sold over ten thousand fenders to 38 railroads in 22 cities. Among the most notable sales recently were Brooklyn Heights Railroad Company, the Atlantic Avenue Railroad Company, and allied lines of Brooklyn, N. Y., for the entire equipment of all their cars with the Crawford's Brooklyn design of fender.

St. Louis is responsible for more rumored railway consolidations than any other place. The latest was a press dispatch wired all over the country to the effect that the St. Louis and American Car Companies had consolidated under a capitalization of \$1,000,000, and would maintain branch works in the east. Our inquiries of the companies interested bring neither a denial or confirmation. The announcement seems to be premature, and at this writing no final result has been reached, though there is good evidence that negotiations have been in progress for some time. The combination would be a strong one.

The Wheeler Rail Joint Company, New York, reports orders for its wedge joint for 28 miles of track from the Staten Island Electric Railway, which will be equipped exclusively with the Wheeler joint; several miles additional for the Terre Haute (Ind.) Electric Railway, replacing less satisfactory joints of other makes; City Electric Railway Company, Port Huron, Mich., to be used in connection with Daniels' steel tie; Cicero & Proviso Electric Railway, Chicago, to be used on chairs; City Electric Railway Company, Marion, Ind., for three miles of 60-pound T rail. In addition, several smaller test orders were received.

One of the largest exhibitors, as is his custom to do things on a generous scale, will be President Peckham of the Peckham Motor Truck & Wheel Company. There will be a full force of representatives to assist Mr. Peckham, and the exhibit will include the very latest and best in the truck line. The constant aim and history of the Peckham truck has been improvement, and each convention only serves to emphasize more forcibly the advance made year by year as new improvements are brought out and methods found to overcome those difficulties which troubled the street car man. The Peckham trucks running on the Park & Island road will likewise be used for exhibit purposes.

The New Haven Car Register Company, of New Haven, Conn., intends exhibiting its complete line of single, double and triple registers and register fixtures at the Montreal convention. A fine exhibit has also been sent to the Atlanta Exposition. The Troy City Railway has just made a contract with this enterprising company for the full equipment of its line with the New Haven double register. Several large roads contemplate adopting the double and triple machines. The separate registration of each class of fares and transfers is coming to be regarded as very desirable, and is accomplished on these registers in a simple and complete manner. Among the many cities in Canada where the New Haven register is in use are Montreal, Toronto, Hamilton, Ottawa, London, Kensington, and Peterboro.

President J. H. Carson, of the Sterling Supply & Manufacturing Company, is smiling these days and related to a REVIEW representative who called at his office how

busy all hands are. They have recently supplied the Citizen's line in Detroit with 300 registers; also the Cleveland Electric. The Sterling register is in use on lines in Washington, New Orleans, Indianapolis, Pittsburg, and the Nassau Railway, Brooklyn. The Consolidated, of Jersey City, the Jersey City & Newark, and in Elmira, Syracuse, Auburn, and Terre Haute. The Broadway, N. Y., lines use 800 and the Third Avenue 700. In addition to their large register business, a large variety of other specialties is handled including the Sterling sand box which has made a great success; and a new brake. The concern also imports direct largely of rattan for sweepers and has a big rattan trade not only with the makers of sweepers but the users as well. Mr. Carson, with several representatives will do the honors of his company at Montreal.

The Walker Manufacturing Company will use every inch of their 1,200 square feet in Victoria rink and will show motors of various sizes mounted on trucks of different makes. They will also exhibit a handsome switch board complete and a new method of armature winding for the Walker motors. In addition there will be controllers, all kinds of car equipment, photographs of various roads using the Walker equipment, generators and apparatus. The company will send a large delegation including the following:—Frank Billings, president; S. H. Short, 2nd vice-president; R. N. Baylis; B. M. Barr; H. McL. Harding; Kohler Brothers; Breese & Mansfield; Moore & Baylis, W. A. Johnson; and a number of others.

The Ohio Brass Company, since the last street railway convention, has been steadily at work on new devices, and has added a number of articles of merit to its line of material, which was then quite complete. Among the most important of these may be mentioned the type K trolley hangers, the Walker trolley ear, the Walker splicing ear, mine insulator, straight under-running adjustable switch, straight under-running adjustable crossover, Detroit section insulator, Chapman insulated adjustable crossover, Buckeye trolley harp, Walker trolley harp and wheel, and Card fuse box. The type K trolley wire hangers are a modification of the well-known West End type, with changes, improving their electrical and mechanical strength. The salient features of the Walker trolley and splicing ears is that they present a smooth under surface without the use of solder.

The Babcock & Wilcox Company, of Chicago and New York, has just contracted to furnish an extra battery of two boilers and two stokers to the Metropolitan West Side Elevated Railroad, Chicago, being an addition to their original plant of 3,600-horse-power of Babcock & Wilcox boilers. The company is just finishing the 3,000-horse-power plant for the Detroit Citizens Street Railroad and another large plant for the Missouri Electric Company, St. Louis. Recent orders for Babcock & Wilcox boilers include 200-horse-power for El Paso

Electric Company, Colorado Springs, Col.; 200-horse-power for Hall Bros., Kansas city; 300-horse-power for Kansas City Stock Yards; 200-horse-power for Matthiessen & Hegeler Zinc Company, La Salle, Ill.; 154-horse-power for Peoria & Pekin Railway, and 600-horse-power for Metropolitan Street Railway Company, Kansas City.

The Standard Paint Company, of New York, will have as good an exhibit at the Montreal convention as can be made, of P. & B. The well known P. & B. tape is not the only product of the company. P. & B. armature and field coil varnish has been used for years by leading manufacturers of generators and motors. Another product meriting the attention of street railway men is the prepared paint for conduits and all kinds of metal and wood work, underground, submerged or overhead. The P. & B. Motor cloth which was first brought to the attention of electric railway companies five years ago, has met with the most flattering reception and is to-day in use by some of the largest roads in the country. It is made on a strong canvas body that cannot be torn and is pliable and elastic. The few who have not seen the P. & B. compounds will be sent samples gratis on application to the company. The exhibit will be in charge of that active and popular general sales agent, Frank S. De Ronde.

The McGuire Manufacturing Company, Chicago, are now working their fullest capacity, and report the following late orders for their well known trucks: North Chicago Street Railroad Company; Chicago City Railway Company; Knoxville, Tenn., Street Railway Company; Missouri Railway Company, St. Louis; Dayton, Ohio, Traction Company; Norwalk, Conn., Street Railway Company; New Orleans Traction Company; General Railway, Light & Power Company, South Bend, Ind.; St. Louis & Meramec River Railway, St. Louis, Mo. The sample trucks for the Lake Street Elevated Railway are completed, and have been inspected and approved by the engineers of the railway company. This truck is the recipient of a good deal of study from steam railway officials, who contemplate changing to electricity. The sale of their rotary track cleaner is unprecedented. They are now working on an order for 20 for the Consolidated Traction Company, which is the largest order ever placed for sweepers by one company. The following are the late orders for sweepers: North Chicago City Railroad Company; Metropolitan Street Railway Company, Kansas City; Mahoning Valley Railway Company, Youngstown, Ohio; New Brunswick Traction Company, New Brunswick, N. J.; Newark & South Orange Railway Company, Newark, N. J.; Bridgeport Traction Company, Bridgeport, Ct. The shipments of sweepers will exceed fifty for the month of October. The company are sending out a very neat lithographic folder, calling attention to their "Columbia" street car heater, and report sales to be, at least, 50 per cent better than for the corresponding period of '94. The new three-story office and store house building of the company is about com-

pleted. It has a frontage of 105 feet on Sangamon street, is faced with brown pressed brick, of a design good enough for a building in the heart of the city. The office will be finished in antique oak, and furnished to match.

RAILROADING IN A FRESHET.

During the freshet last spring at Middletown, Conn., Superintendent E. W. Goss kept his cars running steadily; and for two days through more than a foot of water.



The cars were equipped with G. E.-800 motors and K2 controllers, and went through the flood without burning so much as a fuse strip.

ELECTRIC LOCOMOTIVES FOR PERU.

A railroad company in Peru, South America, contemplates superseding steam engines with electric locomotives. Representatives of the Westinghouse Electric & Manufacturing Company, Pittsburg, Pa., and the Baldwin Locomotive Works have departed for the land of the Incas to report on the feasibility of the change.

The Illinois Central has practically decided on the adoption of electricity for its suburban service, which is the largest of any steam road in the country. The stockholders will vote favorably on the matter in November. The Chicago & Northern Pacific will also undoubtedly adopt electricity on its suburban line.

The Phoenix Iron Works Company, 519 Rookery, has contracted with the Lincoln Water, Light & Power Company, to furnish a 400-horse-power steam power plant, water works and electric light plant.

PERSONAL.

D. A. Belden, general manager Aurora, Ill., street railway, has returned from a tour through the Yellowstone Park.

Robert S. Ashe, formerly of Baltimore street railway connection, was a caller, and will soon take the superintendency of a road in this state.

H. C. Ellis has resigned the management of the Toledo & Maumee Valley Electric Railway to give more time to his interests in brick manufacturing.

Robert Gillham, chief-engineer of the Metropolitan Street Railway of Kansas City has been appointed chief-engineer of the Kansas City, Pittsburg & Gulf Railway.

Henry C. Payne, of the Milwaukee Street Railway, will be missed at the convention this year. He is on his way to Europe, where he will remain for several months.

E. P. Vining, general manager of the Market street system, San Francisco, will be married in November to Miss Agnes C. Brooks, of Brookline, a suburb of Boston.

William Hasty, superintendent of the South Dakota Rapid Transit and Railway Company at Sioux Falls, S. D., was married September 28 to Miss Bertha Van Slyke.

J. C. Cameron, who was superintendent of the Brooklyn City Railroad, has been appointed general superintendent of the Atlantic Avenue Railroad, Brooklyn, N. Y., vice F. S. Hoskins.

Superintendent Denman, of the Toledo Traction Company will have the general management of the Toledo & Maumee Valley Electric Railway in place of H. C. Ellis who resigned.

D. F. Jack has been elected president of the Jacksonville Electric Railway, Jacksonville, Fla. Mr. Jack was for many years assistant to President H. B. Plant, of the Plant system.

Allen Shewmon has resigned as manager of the Belle City Railway Company, Racine, Wis., to become manager of the Green Bay Electric Light & Gas Company. Jackson I. Case succeeds him.

The Central Labor Union of Terre Haute has passed many complimentary resolutions commending President Russell B. Harrison of the electric railway for his public spirited action in establishing Harrison Park.

Morris W. Hall, secretary of the Camden Horse Railroad Company, Camden, N. J., accompanied by his brother, Dr. Hall, of Philadelphia, called on the REVIEW on their way home from the far west. Their trip included

200 miles of staging through the mountains and a visit to an Indian reservation.

Major E. B. Ives leaves the Electric Traction Company, Philadelphia, to become chief engineer of the Allentown and Reading electric. A. H. Engstrom has been promoted as chief engineer in his stead.

Frank X. Cicott, manager railway department of the Billings & Spencer Company, has been visiting his many Chicago and western friends. He is distributing a very neat paper weight made of a segment of commutator.

Henry P. Merriam who was formerly in charge of the electrical and mechanical work of the Albany railway, and who has also contributed to the technical press, is now connected with the Standard Air Brake Company.

Daniel McLoud, one of the progressive railway men of the southwest, and general manager of the Ft. Smith, Ark., Street Railway, spent a month among the northern lake resorts and called on the REVIEW when homeward bound.

Thomas Jenkins, superintendent of the South Covington & Cincinnati Street Railway Company, was married September 30 to Miss Henrietta Healy. After making a tour of the east they will visit the convention at Montreal.

S. Roy Wright, Denver, is actively pushing matters towards the early construction of the Denver, Globeville & Golden Rapid Transit Company, of which he is general manager. Construction of 29 miles electric will be commenced very soon.

William S. Love, one of the most popular supplymen in the West has been appointed western agent for the Abendroth & Root Manufacturing Company, and will make his headquarters in the Monadnock building, this city. Mr. Love is both energetic and successful, and it is needless to add, will ably represent this well known concern.

R. B. Holbrook, formerly chief engineer of the Cedar Rapids & Marion City Railway has been appointed chief engineer for the American Cereal Company, with headquarters at Akron, O., and will have charge of all its steam plants. The street railway industry thereby loses one of its most intelligent power plant engineers.

C. F. Hutchings, who for three years was superintendent of the Vancouver, B. C., Electric Railway & Light Company, and more recently shop engineer for the Westinghouse Electric & Manufacturing Company, has been appointed superintendent of the Wilmington City Railway and the Gordon Heights Railway, Wilmington, Del.

Col. D. B. Corwin, president of the City Railway Company, Dayton, O., packed up his grip and outfit a few weeks ago telling his friends that he was going to

take a little trip to his favorite Dakota hunting grounds. On September 21 the Colonel's friends learned that he had had a successful trip, but was after a different kind of game than they thought. The news came in the shape of cards announcing the marriage of the Colonel and Miss Jessie M. Pitzer, DeSmet, S. D.

The friends of D. H. Louderback, and their name is legion, will be glad to learn that the rumored loss of his eyesight is not now feared, and although quite a critical case he hopes to resume business soon. On September 25 while engaged in his office he instantly lost the use of his eyes and was at once put under the care of expert oculists and confined in a dark room. The misfortune grows out of an accidental gun shot wound 20 years ago, in which a gun in the hands of his companion was accidentally discharged while hunting. We sincerely trust his recovery may be complete and speedy.

STATE ASSOCIATION MEETINGS.

Three of the state associations have held their annual gatherings, and as usual, all have been pleasant and valuable occasions, in which the interchange of ideas and acquaintanceship will continue to bear fruit for months to come.

NEW YORK STATE

Association met at Albany on September 17, the gathering proving the most successful in its history. President G. Tracy Rogers, of Binghamton, presided. In his opening address he first paid a fitting tribute to the late secretary William J. Richardson, who had held the office since organization. State legislation had not been unfriendly, roads were steadily raising the standard of construction and equipment, progress of electricity on steam roads was encouraging. In New York state are now 1,400 miles of street railway, an investment, of \$200,000,000. Its lines transport annually 500,000,000 passengers, earning \$25,000,000. As an investment, street railway securities are in a much improved condition. A greater effort should be made to place the securities locally, where the lines are built.

J. P. Clark, temporary secretary, reported for the executive committee. Receipts \$7,286; expenses \$6,299; balance \$986.

The program was an excellent one. "Are We Laying Too Many Miles of Track to Reach a Few People?" by W. W. Cole, Elmira; "Car Heating by Electricity," J. F. McElroy, Albany; "General Track Construction," C. L. Allen, Syracuse; "Economical Equipment and Operation of Power Houses," H. S. Newton. "Is a Freight or Mail Service Profitable or Unprofitable on Street Railways," Benjamin Norton; "Signals on Electric Railways," J. H. Barnard, New York.

It was decided inadvisable at present to admit supplymen to membership. An excursion was held to Troy, and a banquet at the Kenmore. Officers elected were: President, G. T. Rogers, Binghamton; First Vice,

W. W. Cole, Elmira; Second Vice, John H. Moffit, Syracuse; Secretary and Treasurer, Benjamin Frick, Brooklyn; Executive committee: H. H. Vreeland, New York; Henry M. Watson, Buffalo; John W. McNamara, Albany.

Among the exhibits the following were represented with a very attractive display; Peckham Motor Truck & Wheel Company; International Register Company; R. D. Nuttall Company; New Haven Car Register; Stever Rail Joint; Hughes Fare Register; Consolidated Car Heating Company; St. Louis Register Company; McPherson Sand Box Company; Johnson Company.

The next meeting will be held at Binghamton.

MICHIGAN ASSOCIATION.

The Michigan State Association met at Grand Rapids. Business session was held at the Lakeside club house where a dinner was served and a tour of inspection made of the lines. Members present were W. Worth Bean, St. Joe; A. L. Dixon and W. L. Jenks, Port Huron; J. P. Lee, Lansing; Frank Huntoon and G. H. Hart, Manistee; F. N. Rowley and L. N. Davis, Kalamazoo, E. F. Erwin and Fred Nims, Muskegon; after transaction of business, association adjourned to convene again next December when a complete program of papers will be discussed.

OHIO ASSOCIATION.

Quite an interesting gathering of street railway men was the annual meeting of the Ohio Tramway Association, September 25, at Sandusky. No papers were read but several subjects were thoroughly discussed. The social features were a visit to Kelly Island and a trip over the lines of the Sandusky, Milan & Norwalk Railway Company. Next year the association will meet on the fourth Wednesday of September, at Mansfield, when supply men will be invited to exhibit. The old officers were re-elected: President, W. F. Kelley, Columbus; vice-president, Reid Carpenter, Mansfield; secretary and treasurer, J. B. Hanna, Cleveland; chairman executive committee, W. A. Lynch, Canton, O.

CHICAGO IN 1896.

Chicago will present to the association a warm urgent invitation to meet in this city in 1896. The request comes from all the street railway companies, to which we can add the hearty co-operation of the manufacturers and supply men in the railroad line, and the electrical press.

It is unnecessary for us to go into details as to the ability of Chicago to handle an occasion of this kind. No other city in the country is so central, or will draw as large an attendance from remote districts as this. The world already knows what a Chicago welcome is like, and its the real genuine Chicago article that awaits the street railway men of the world. In behalf of the proffered hospitality we sincerely trust the invitation will be accepted.

NEW POSSIBILITIES FOR LONG ROADS.

At New York and Chicago on September 25, a paper by Charles S. Bradley was read before the Institute of Electrical Engineers on some work he has been doing recently which may have an important bearing on the long distance electric railway work of the future. The title of the paper was "Phasing Transformers" and it dealt with a method devised by Mr. Bradley of changing an alternating current of one phase into a current of two or three phases. If it proves a commercial success the bearing it will have on railroad work is this:—When current is to be transmitted over a long line of road it is necessary to do it at a very high pressure in order to avoid the loss in line or the great investment in copper otherwise necessary. Before it can be safely used on any rotating mechanism, such as a railway motor, it is necessary to transform it down to a lower pressure. This necessitates the use of an alternating current which can be transformed from low to high and from high to low pressures in stationary transformers. With the use of the alternating current, however, a new dilemma presents itself. The single phase alternating current requiring only two wires to conduct it to a car is not suitable for a self-starting railway motor. The only self-starting alternating current motors are multiphase motors and to conduct a multiphase current requires at least three wires. This means a double trolley or something equivalent to it in addition to a ground return. Mr. Bradley's arrangement allows a single phase current of very high pressure to be sent out over the trolley line. It can be transformed into a multiphase current for the motors by a stationary transformer on the car. Thus a single trolley system without rotary transformers is made possible for long distance work, and besides this advantage the high pressure on the trolley line decreases the current

which must be conducted through the trolley wheel or collector, thereby allowing a large amount of energy to be conducted with very light and simple contact devices.

MONTREAL FROM NEW YORK.

Convention visitors from the east should take the palatial New York Central Railroad which will run a special train from New York City on Monday October 14. Leaving at 6 o'clock in the evening, the special will arrive in Montreal the next morning at 8 o'clock. A stop will be made at Albany to connect with the New England delegation. For rates of fare and to engage berths, write at once to George H. Daniels, General Passenger Agent, Grand Central Station, New York.

TWO MORE HARVEST EXCURSIONS

To the Northwest, West and Southwest have been arranged by the Milwaukee & St. Paul Railway. Tickets will be sold on October 8th and 22nd at rate of about one fare for round-trip. For tickets and further information apply at the ticket office, 95 Adams street.

Baron Munchausen

Sighted sixty-eight fat canvas-backs one morning just as he had fired his last bullet at a tree. A moment later he found a fat oyster containing a pearl of surpassing beauty. Ordinary mortals would have been satisfied with the pearl. Not so the baron. Loading his gun with the pearl he patiently waited more than a week till all the ducks were in a straight line when careful aim sent the pearl through sixty-seven and into the sixty-eighth duck where it was recovered. This on the authority of the noted politician, John Kendrick Bangs, Esq.

We never landed sixty-eight ducks at one shot, but we landed the order for thirty-two Standard arc-light dynamos, and, moreover, secured it from a licensee of the combination that started in to dictating its own terms to every central station man. As dead as Baron M. is that combination, and we drove its first nail in its coffin.

Study our book; 'twill put money in thy purse. Mailed free.

STANDARD ELECTRIC COMPANY, 205 LaSalle St., cor. Adams, Chicago.



ACME Insulating Paint

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Good Body, Dries at Once,
Adhesive, Flexible.

Acid and Oil Proof,
Water and Weather Proof.

The Paragon Insulating Co.
1025 SOCIETY FOR SAVINGS BLDG.,
CLEVELAND, O.

C. E. LOSS & CO., General Railway Contractors.

Estimates made on all classes of Engineering Work.

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WARDWELL BROTHERS, Electric • Railway • Builders, DANBURY, CONN.

Will make Proposals for the Construction of all Classes
of Street Railway Tracks, Power Houses, Etc.





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CORRESPONDENCE.

We cordially invite correspondence on all subjects of interest to those engaged in any branch of street railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

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THE big fight at Montreal was on the admission of supplymen to some form of membership. Some delegates favored it on the ground that the association needed their money. Not a very gallant position to take to say the least; although the supplymen, with characteristic liberality, offered to clean up the whole debt in an hour, without any membership, and would have done it, too. The association, however, saved its honor by paying its own debts, as it should have done.

BUT the strange part of the matter was the marked apathy with which the supplymen viewed their fate. The REVIEW, after a diligent search, found only one supplyman who favored the scheme, and this was his first convention. Joel Hurt stated he had also found one, but only one. What the supplyman is to gain under a membership which gives him no vote or voice and bars admission to executive sessions, is hard to see. It is a radical case of taxation without representation.

ALL's well that ends well, but nevertheless one cannot consider without a feeling of mortification the fact that a body of men, representative of so gigantic interests as the street railway system of this country, spent so much time in coming to a settlement of differences which should have been accomplished in 30 minutes.

WHEN the members once had a chance at the debt short work was made of it. Capt. McCulloch forever immortalized St. Louis with his \$800 subscription which electrified everybody. It was a noticeable fact that some of the largest roads in the country either gave nothing or contributed but feebly in proportion to the smaller ones.

THE supplymen justly felt aggrieved at their treatment this year. In the first place it was a fatal mistake on the part of the local committee in charge to select a building so cold as a natural-ice skating rink, without making some effort at warming it. A few large temporary stoves would have made the place at least endurable. As it was, the men in charge of displays actually suffered and 20 minutes was enough to give a visitor, moving about in heavy winter garments, the chills. Then delegates were kept hour after hour in executive session and debating on the admission of supplymen, where supplymen could no more get at them than if they had been in Quebec. This too, after making a big effort to put up a creditable and really valuable display.

IN the matter of program, two of the four papers were furnished by supplymen and it is hard to excuse the neglect which was the cause of this shortage. The secretary pro-tem should either have declined to fill the office, or having accepted attended to its duties even though at some trouble to himself. As it was, he did not even attend the meeting. This was a gross injustice to the association, but fortunately is not likely to ever be repeated.

THE ladies turned out in good force, and made the best of the situation in entertaining themselves; for as usual their escorts could give but little time. True, the novelty of a free ride on the street cars was theirs, and we presume the freedom of the city, also; but by so utterly ignoring them the Montreal ladies missed the opportunity of a lifetime. One could but recall the glorious hospitality of the resident ladies of Washington, Milwaukee, Cleveland, Buffalo and elsewhere.

STILL with all the shortcomings there was much to enjoy and study in a city which, in many respects, may be a model to our municipal management, and the ideas and experiences one gains by meeting his fellows in the fraternity will alone always well repay the time necessary to go and come.

THE work of the executive committee was arduous and painstaking, and in its report and recommendations was hampered by a debt the existence of which was not generally known. The association is under deep obligation for the conscientious and unsparing efforts of the committee.

UNDER the circumstances it was surely a wise decision which deferred action on enlarging the scope of the association. Before it is again taken up for consideration

members will have had ample time to study the situation and decide more understandingly than could have been possible this year.

THE meeting was an object lesson of what a convention would be without the supply men. They are very largely the life of it, but what they desire more than membership, and what they are justly entitled to is the setting apart on the program of a sufficient time each day to enable delegates to make a thorough study of exhibit hall without being forced to miss anything else.

THE association starts out with renewed life and usefulness, and the St. Louis meeting may be absolutely counted on as the best ever held. Nothing will be left undone to make the occasion a grand success and the attendance will doubtless be a record breaker.

It would not be a bad plan for roads with sharp curves to prevent children from sitting in end seats. A Massachusetts road is defending a damage suit because a child was thrown off a seat when a car went around a curve.

IN our power-house department this month attention is directed to the comparative economy of steam and electric pumps for boiler feeding in electric plants. The problem seems to have met with greater favor in England than here, although it is deserving of careful investigation.

THE article in this issue on welded joints, by Richard McCulloch, the rapidly rising electrical engineer, of St. Louis, is the most complete and detailed description of the subject ever published. And it offers not theory, but absolute facts, compiled from actual every day experience in the use of both electric and cast welded joints. The jointless rail is undoubtedly the greatest advance in track construction evolved during the past 20 years.

IN our issue of December, 1894, we called attention to the fact that the acceptance of commissions by men in responsible places who are entrusted with the purchase of steel railway supplies was getting to be entirely too common for the good of the stockholders and the best interests of the trade in general. At the time we were as "one crying in the wilderness," but it is very gratifying to note that since that time there has been a shaking up in several quarters, and the technical press has industriously fallen in line to condemn the practice. Whatever may be said of the bribery business by those who are engaged in it, and who try to defend their actions, it will take a long time to convince the stockholder or the honest supply man who sells goods on their merits that it is anything but an unmitigated evil. Stockholders and supply men can well co-operate to stamp out the evil and both will be better off as a result.

THE secret of the great popularity of trolley parties over which the elite of Philadelphia have become so highly enthusiastic is now revealed. It is not so much in the pleasures of a delightfully fast, cool ride, in the warm

evenings, although this alone should be sufficient to make the fad deservedly popular; as it is "the tunnel." When for any cause, accidental or otherwise, the trolley leaves the wire the lights of course are instantly extinguished. And this causes "the tunnel." On every such occasion it becomes the prerogative of the young man to salute the young lady next him with a trolley kiss. Just how a trolley kiss differs from any other we are not advised but presume it is accompanied by a good deal of sparking. The imminent danger that the lights may be turned on at any instant thus bringing the car out of the tunnel only adds zest and excitement to the game. Now that the possibilities of the trolley party are fully known we look for a big boom in this department of street-caring.

IN power-house department this month is continued the report of operative expenses, statements being published from six roads. The figures have been obtained after much labor, and should be studied by every manager and engineer, for in this way, and in this way only, can the best economies be ascertained. We urge those managers who have not yet reported, to do so at once. Wherever the request is made the identity of the road and sender will not be disclosed; but every progressive manager is interested in these figures and should be willing to contribute his quota toward the general fund of information, even though the results shown are against him. As may be supposed, some roads are actually unable to fill out answers to our questions, and confess they know only in a general way what their power costs. Such a condition may pass for a time, but the day is not far distant when stockholders will insist upon detailed expenses and if it is not forthcoming or is found radically out of shape in certain directions, some one will be hunting for another job. The part of honesty and wisdom is to absolutely know that expenses are as low as is consistent with good practice and the local price of labor and supplies.

THE AMERICAN MACHINIST "BRAKES" OUT AGAIN.

The American Machinist has been kept busy lately trying to answer the "horse laugh" that went the rounds of the electrical press when it seriously and at length, propounded the proposition that the real reason that quick acting brakes have not come into use on trolley cars is that the motors and gearing would not stand the strain with such brakes. Said proposition has been sufficiently proved false both by us and other electrical contemporaries, and we do not care to give any more space to the discussion of such a fruitless subject. If the American Machinist still believes (and apparently it does) that a quick acting brake would smash the gearing, if used, we would be pleased to take a representative of that paper out on the road and show him in actual operation several types of brakes (friction, air and electric) that can stop an electric car in as short a distance as possible, consistent with the adhesion of the wheels to the rails, and that is all that can be done with any wheel brake. The Ameri-

can Machinist's method of tackling the subject of electric car brakes reminds us very much of Don Quixote and the windmills.

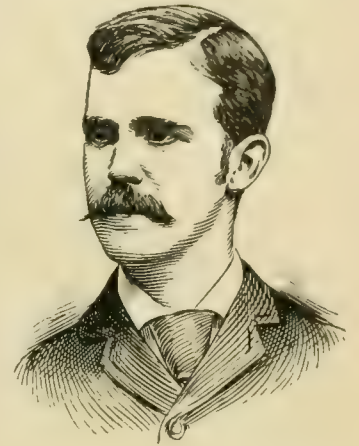
CANAL BOAT TOWING TEST ON THE ERIE CANAL.

New Plan Tried at Tonawanda—Logging System Applied to Canal Boats.

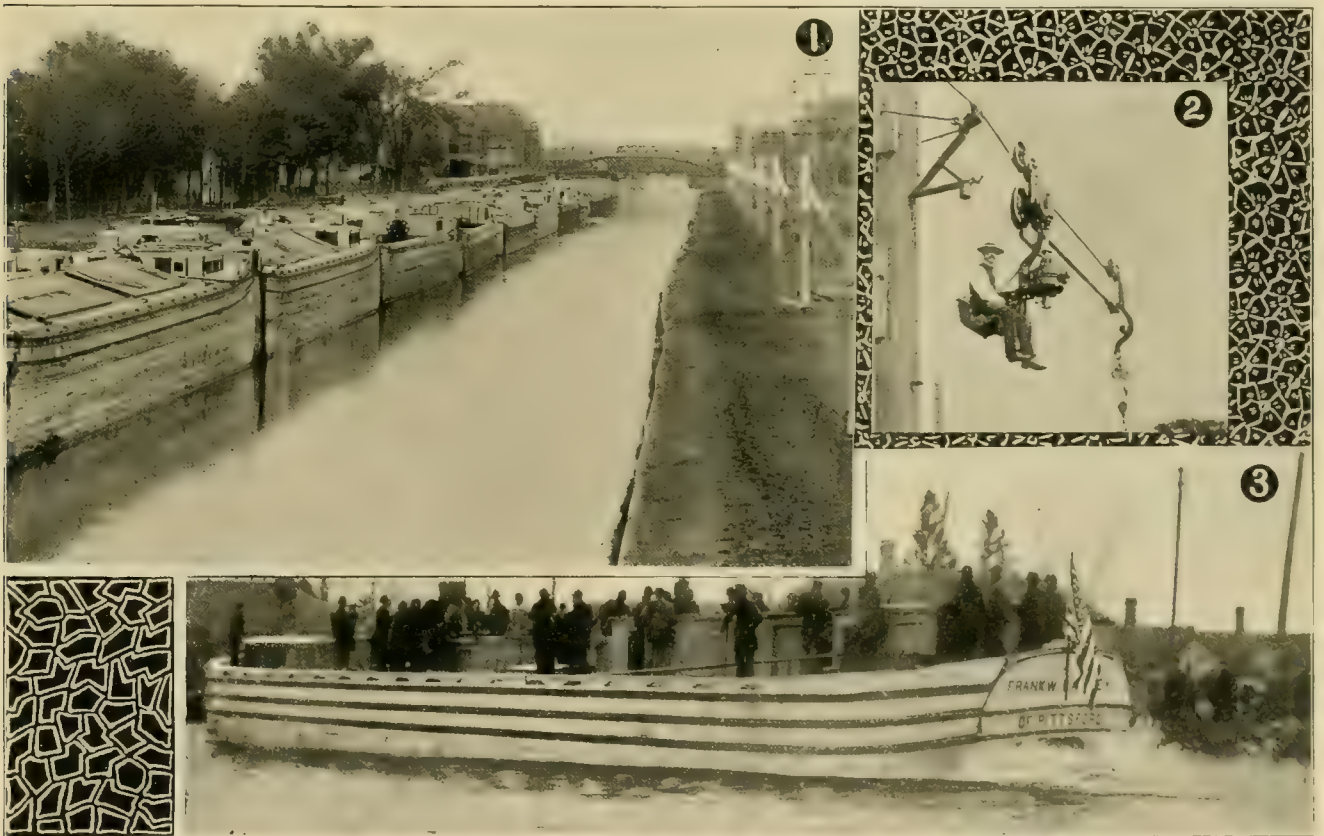
It now seems probable that within a short time the electric motor will replace the mule on the canal as completely as it has on the street railway. On the canal as on the street railway, man has labored for years to find a method of traction that would bring release from the slow going animal power but all the methods presented have without exception failed to drive the mule from the towpath. The tests during the latter part of October of the Lamb system of haulage at Tonawanda, N. Y., on the Erie canal give great promise of being the beginning of a revolution in canal traction methods. The systems heretofore considered, seemed to clearly demonstrate

reason that the system invented by Richard Lamb and consisting of a suspended cableway upon which the motors run, was chosen for trial.

On posts 100 to 125 feet apart are supported two cables one above the other. From these the motor is suspended. The top one takes the weight and a few wraps of the bottom one around a sheave on the motor device furnishes the traction. The upper cable on which the weight hangs is made of the hardest crucible steel with a tensile strength of 132,000 pounds. It is $1\frac{1}{4}$ inches in diameter and has a conductivity equivalent to three number 0 wires. The lower cable is of steel and $\frac{5}{8}$ inches in diameter.



RICHARD LAMB.



1. Scene of Present Experiment. 2. Motor as used in Logging. 3. Trial in 1893 with Motor on Boat.

ELECTRIC TRACTION ON THE ERIE CANAL.

that for successful canal transportation the water in the canal must be used only for floating the boat, and the propelling devices or application of power must be foreign to the water to prevent destruction of the banks by washing. Physical conditions required the motive power to be on the bank and legal conditions in this case required the towpath to be left free for the mule. It is for this

The cables are three feet apart. The supports of the upper cable are insulated and it corresponds to the trolley in an electric railway system. The current flows out through it to the motors and back over the lower cable which is grounded. The top cable is 16 feet from the ground. The motor truck running on the top cable has two deep grooved wheels running on the cable. The

weight of the motor is suspended from a horizontal axis between the wheels and below their center line. The $\frac{5}{8}$ -inch lower traction cable is wrapped three times around a sheave which is geared to the motor. This sheave is connected to the motor by worm gearing and the axle of the motor is vertical. The worm gear used here differs from an ordinary worm gear by having a greater bearing surface and by having ball bearings to lessen the thrust friction. The gears and ball bearings are in a case filled with oil. The motor used weighs 1,200 pounds, is rated at 25-horse-power and runs 1,240 revolutions a minute. Of course the truck has to be insulated from the motor frame, as the truck serves as a trolley. The points of insulation are provided with hoods to shed water. The rheostat is put on the motor but the controlling is from the boat. The cable of wires between motor and controller also serves as the tow line. When a motor is to be run without any boats in tow its rheostat and conducting-wire tow line is placed upon the motor, and a driver on a seat on the electric mule operates it.

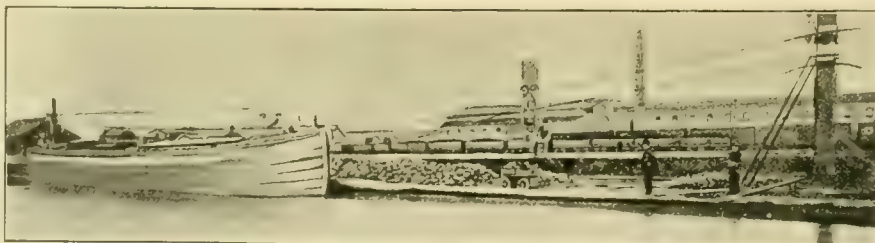
The official test was made October 26, and was witnessed by a REVIEW representative. In recognition of the importance of the test ex-Governor Flower, State Superintendent of Public Work George W. Aldridge, State Engineer and Surveyor Campbell W. Adams, State Electrician Charles R. Barnes, and others of prominence were present. The electrical power was obtained from the station of the Buffalo and Niagara Falls Electric Railway. Richard Lamb, the inventor of the motor, acted as motorman, and when he turned the lever his device moved off along the cable towing a boat loaded down with invited guests. The experimental line was 1.21 miles long, and despite a strong wind and a strong current the motor towed the boat along at the rate of three and three-fifths miles per hour. In this run the motor heated slightly, but not sufficiently to prevent it taking hold of a line attached to five loaded boats, which it towed down the line at the rate for four and seven-tenths miles per hour, much to the satisfaction of everybody present. The water where the test was made had a depth of eight feet and it was noticeable that the boat's speed did not stir it sufficiently to cause washing of the banks. While the boat was under way on the trip ex-Governor Flower made a speech commendatory of the success of the test and pointed out that it meant a cheaper cost of transportation and greater facilities to compete with railroads. Of the event State Electrician Barnes said:

"I have no hesitation in saying that the test was entirely successful and demonstrated to my mind the fact, that it may and will be applied generally upon the

canals of this State, and that it will result in very materially cheapening the cost of canal transportation as well as increasing the speed of boats. Taken in connection with the proposed improvement of the State canals, it will result in greatly increasing the capacity of the canals for transportation purposes, it will cheapen the cost of same, and it will thus increase the power of the canals to control the freight rates between Buffalo and tidewater. In what I have said in relation to the plan adopted in the test at Tonawanda, I do not mean that the particular plan or machinery there used is the only or best one which ingenuity may devise in the future, but I do mean to be understood that this particular plan is simple, cheap, can be readily and cheaply applied to the present canal boats and will successfully do the business."

The test made was under the authority and direction of the superintendent of public works, with the approval of the state administration. The legislature authorized experiments to be made in applying electricity to the propulsion of canal boats; it subsequently authorized the public works department to enter into a contract with the Cataract General Electric Company for the equipment of the canals with some system of canal towing, but first to be duly approved by the superintendent of public works. A contract drawn by Governor Flower was entered into with the Cataract General Electric Company, which was authorized during a term of 50 years to maintain and operate a system of canal boat propulsion upon all of the canals of the state of New York. It permitted the use of either or both banks of the canal and all canal lands, provided, that the present method of towing was not interfered with. It also allowed the Cataract General Electric Company to carry its power mains over all canal lands and through cities along its line for local distribution thus relieving the company from the necessity for municipal action when seeking to enter to supply electricity. The Cataract General Electric Company entered into a contract with the Erie Canal Traction Company to apply and operate the towing line at a cost not to exceed \$3,000,000, which amount was subscribed. It being necessary that whatever system is adopted be approved by the commissioner of public works the formal test just described was made. Another system in which the motor was put on the canal boat and made to drive a propeller (current being supplied by a double trolley over the canal) was tried in 1893 and approved by state authorities but the Cataract company thinks the cableway system is superior.

It is estimated that with electricity the cost of motive power will be reduced 82 per cent over mules and 55 per cent over steam. If the company can sell motive power at such rates the mule will not be slow to resign.



TOWING A CANAL BOAT.



SCENES ON BRISTOL, ENGLAND, ELECTRIC TRAMWAYS.

THE BRISTOL, (ENG.) ELECTRIC TRAMWAYS.

First to be Installed Under the New Rules—Provisions Made to Test the Ground Return.

Owing to the iron clad regulations of the English board of trade enacted in 1894, the building of an electric road in England to-day involves much greater engineering skill than the installation of a road in this country. All the electric roads heretofore built in England were put in before the board of trade rules were drawn up. The road at Bristol now being put in operation comes under the new regime. Engineering, of London, gives an interesting account of the precautions that are being taken on that road to live up to the board of trade requirements, from which the following facts are gleaned. The board of trade rules were very largely instigated by the general postoffice authorities who were in mortal terror lest their telephone service be interfered with by induction or leakage. Particular attention is paid to the ground return. The rules require that a continuous record be kept by the company of the difference of potential between the farthest point on the ground return and the negative bus at the power station. When this drop in the ground return exceeds 7 volts the road must be stopped or the drop reduced. In another clause it is stipulated that the insulation of feeders and trolley wire shall be maintained so that the leakage will not exceed .01 amperes per mile of road. While these clauses may be called in a measure restrictive it can not be denied that after all it is to the interest of an electric railway to conform to these standards even if they were not legally enforced, because by so doing the economy of working is increased to a maximum. The main defect in the rules is that they provide for a maximum drop in the ground return, whereas to be consistent they should provide for a certain drop per mile. Under the present rule of a 7-volt maximum drop, a very short road could

legally have a very serious drop in its return, and one that would make mischief. On the other hand, a long road would be put to almost a prohibitive expense to keep its ground return loss within the limit even though the drop per mile and consequently the detrimental effect on surrounding conductors is small.

The power station of the Bristol road is near the middle of the line and contains a number of features from which American engineers can get some valuable hints. The electrical apparatus is all the work of the British Thomson-Houston Company. The boilers are the efficient Lancashire type, 30 feet long, $7\frac{1}{2}$ feet inside diameter, with furnace tubes 3 feet in diameter. The plates are $\frac{23}{32}$ inch thick for the shell and $\frac{17}{32}$ for the furnaces. Green fuel economizers and Vicar's mechanical stokers are employed. The stokers are driven by an electric motor and this same motor drives the scrapers for cleaning the economizers. Electric motors are also used to drive the feed pumps,—a very sensible arrangement. There are two of these electric pumps each capable of delivering 16,000 pounds of water per hour against 160 pounds boiler pressure. The three engines are of the Willans central valve compound high-speed type, each driving by ropes a 110-kilowatt generator. Storage batteries are to be used for lighting the station when the steam plant is shut down and for car lighting. While Americans will agree that the former is a good thing the latter will be considered as an unnecessary and uncalled for complication and expense, unless there is such a large drop of potential in the overhead lines as to make the voltage very unsteady. These batteries are charged by a 30-kilowatt motor generator run from the bus bars and giving 135 volts at its secondary terminals. The fields on the motor side of this machine are compound wound, the series-coils being in the circuit supplying the motor end, so as to keep the speed as near constant as possible for the accumulator work. The voltage of the secondary armature can be varied from 105 to 130 volts.

To conform with the board of trade testing requirements a special switchboard, shown in Figure 1, was designed. At the left in this figure is indicated an ammeter with two scales one reading from $\frac{1}{2}$ to 3 and the other from $\frac{1}{2}$ to 10 amperes. This can be connected between any of the generators and the positive bus bar when the main generator switches are all open and thus the leakage on the overhead system noted. In the middle is a recording ammeter connected between the negative bus bar and two earth plates, presumably to give some idea of the electrical condition of the earth near the station. At the right are two devices for continuously recording the difference of potential between the negative bus at the station and the most distant portions of track. A test wire is run to the ends of the line for this purpose. One of the devices is used on one part of the line and another for the other. One of these is a group of 6 Leclanche cells in series with a sensitized paper polarity recorder. The cells are connected so as to oppose the polarity of the line. As long as the drop in the ground return is less than the board of trade requirements the Leclanche cells send a current through the sensitized paper contrary to the pressure of the railway current. When the drop is too great the cells are overpowered and current flows in the opposite direction.

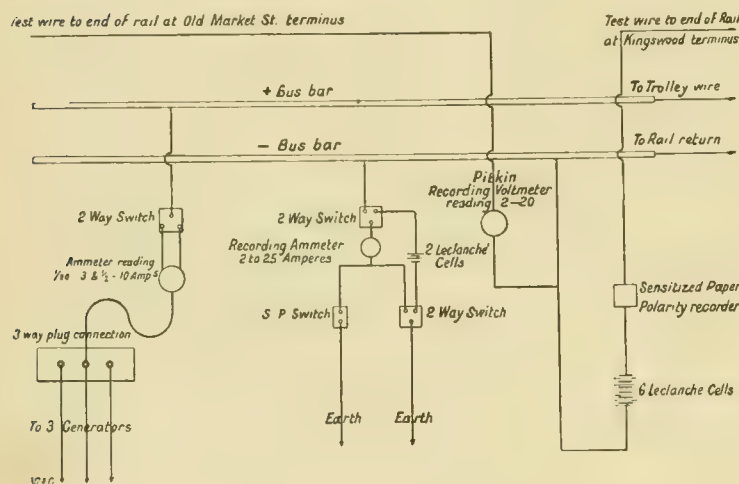
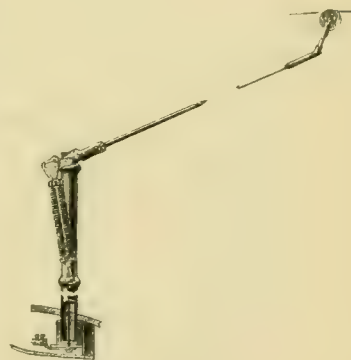


FIG. 1. SWITCH BOARD CONNECTIONS.

Such change in direction is indicated by the sensitized paper. For testing the other end of the line a recording voltmeter with a range of from 2 to 20 volts is used. The rails are 76-pound. A test made for drop of potential in the return circuit showed $3\frac{1}{2}$ volts drop from one end of the line 2 miles from the power station with six cars bunched and starting there at once. For $1\frac{1}{4}$ mile from the station the rails are double bonded with 000 Chicago bonds and the rest of the distance are single bonded. There are no supplementary wires,—the rails and bonding alone being depended on for the return.

All the electrical apparatus except the board of trade switch board just described and the trolley poles, is American. The cars are equipped with G. E. 800 motors and K controllers, on Peckham trucks. The line material is from the Albert & J. M. Anderson Company,

and the poles from Morris, Tasker & Company. Even the wire and miscellaneous supplies are from this country. The arrangement of the trolley wire and trolley pole is, however, "strictly of England." It is (with slight modifications) the plan put on the South Staffordshire line by Alfred Dickinson three years ago. The trolley pole swivels on top of a post, so as to be out of the way of roof passengers and the trolley wheel



THE TROLLEY POLE.

again swivels on the end of the pole with a sort of bed caster arrangement. With this style of trolley it is said that the wire can be run 8 feet from the center line of the car without trouble. This permissible variation in the distance of the trolley wire from the center line of track makes possible the use of bracket construction throughout, as shown. For engravings of the trolley construction we are indebted to the London Electrical Review.

THREE MILES BUILT IN 23 HOURS.

Horse cars have been running for years on Indiana avenue, this city, from Eighteenth street south to Fifty-first street, where the line turns into Washington park. From Thirty-ninth to Fifty-first there was no objection to the trolley, but north of Thirty-ninth the residents of this swell avenue have opposed the trolley, just as they did for years the change from single to double track. So bitter has been the fight on the north end, the City Railway concluded that when construction of the south end was commenced it should be a quick job. And so it was. At 11:30 Saturday night a long line of wagons loaded with materials, and 300 men, sallied forth. There were 20 teams drawing poles, 50 teams with macadam, 30 with sand, 10 of cement, 4 with tools, 4 tower wagons, 2 crane wagons, several with water tanks, and a wreck wagon. All moved with military precision. Electrician Knox, on foot, headed the van, and as fast as he paced off 115 feet between poles, the pole wagon dropped poles at the required places, with a lighted wagon, and as the army of workmen marched behind four men were counted off—two for each pole hole. The other materials were distributed in the same logical and methodical manner. One wagon set 100 poles in eleven hours. The work was completed, current turned on, and electric cars running on the one and a half miles of double track in 22½ hours. The overhead work included two rows of side poles, span, feeder, and trolley wires; the track work was already finished with exception of two switches and a crossing of two steam tracks, which was taken up and relaid with new.

Superintendent Bowen displayed genuine generalship in his plans and their execution.

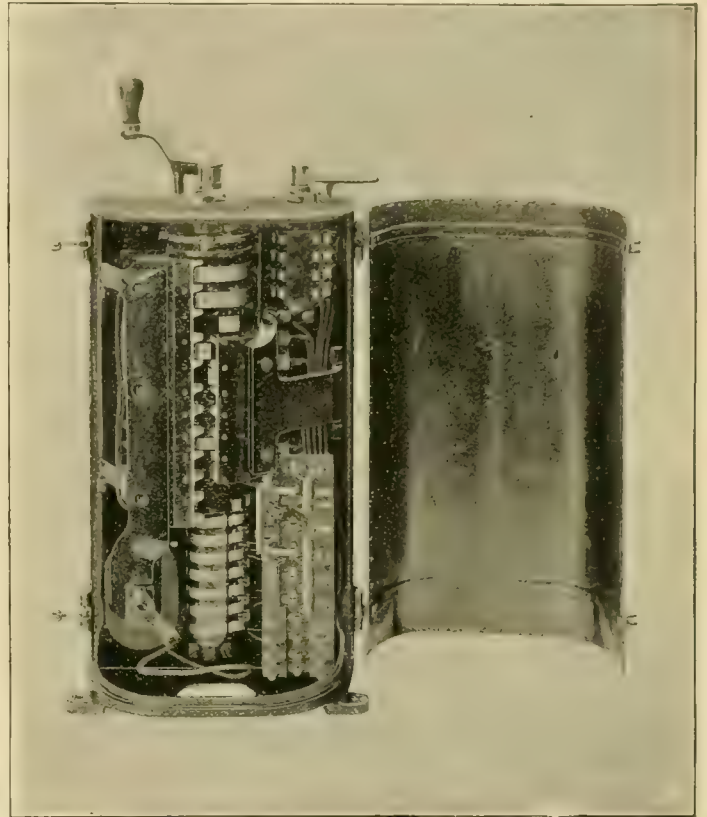
THE GENERAL ELECTRIC COMPANY'S ELECTRIC BRAKE.

For some months past it has been a common rumor that the General Electric Company was about to put an electric brake on the market, and it was therefore a matter of no great surprise, when at Montreal convention, the most prominent and important feature of that company's exhibit was a Peckham extra long 6 E truck, fitted with two G. E. 800 motors and an electric brake. The brake is the Sperry electric brake adapted for use with the series-parallel controller. The General Electric Company has acquired the Sperry patents and with Mr. Sperry's assistance its engineers have been perfecting the device. The company also owns many other electric brake patents.

The current for braking is derived from the motors generating current as dynamos and actuating magnetic brake discs on the axles. A detailed description of this general form of brake was given in the REVIEW for August, 1894. The only essentially novel feature of the present brake is its use in connection with two motors and the series-parallel controller. The controller is only a little larger than the ordinary K 2 and controls both brake and trolley current. The brake is absolutely independent of the trolley. Turning the handle one way from "off" position turns on trolley current to start the car, and turning the other way from "off" operates brake.

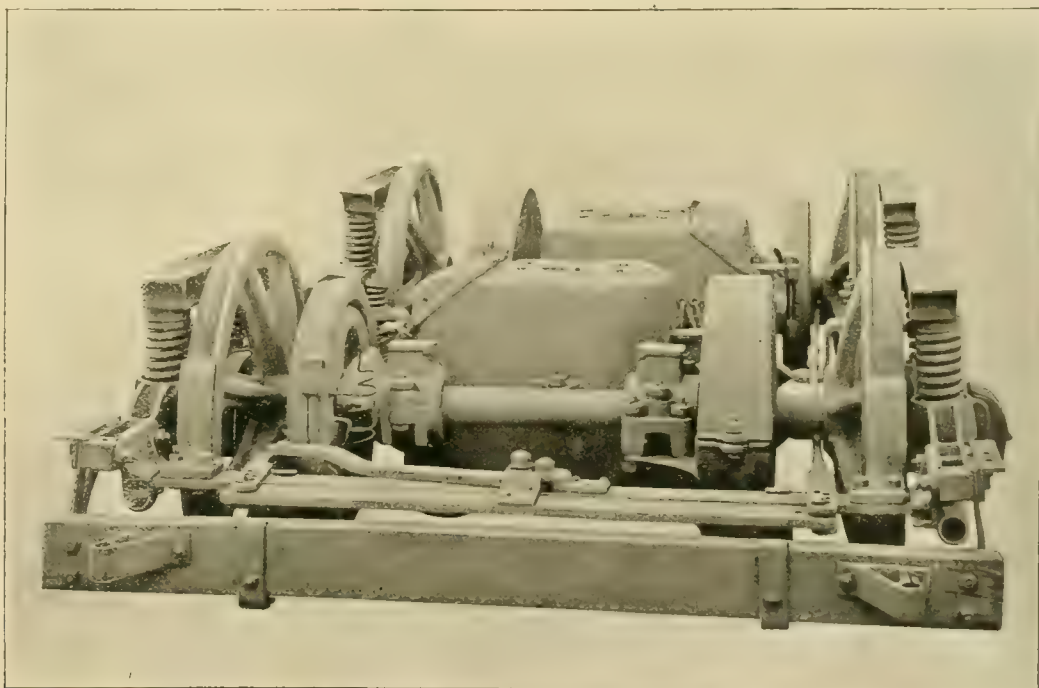
The electric brake operated by the motors acting as dynamos offers a sure relief from troubles with skidded flat wheels, and on this account, as well as its ability to make quicker emergency stops than any other form of wheel brake, it will probable meet with a warm welcome now that it has been taken up by a large concern. In its

present form it can be applied to any car without changing of wheels, adds very little to the mechanism on a



THE CONTROLLER.

car, and requires practically no more inspection or repair than if the car had only the ordinary electrical equipment.



GENERAL ELECTRIC COMPANY'S ELECTRIC BRAKE.

ADVERTISING CAR AT SIOUX CITY.

The Sioux City Traction Company maintains an advertising department under the charge of Frank L. Brown. During fair week at Sioux City recently, a novelty in the advertising line, the design of Mr. Brown, was tried with very satisfactory results. On a truck equipped with a single motor was built a light box car for advertising purposes only. There are two sets of



FIRST CAR BUILT SPECIALLY FOR ADVERTISING.

advertisements, one for day and the other for night. Electric lights are of course made good use of. Inside is an organ run by an electric motor. As said before the plan was a profitable one to the company and that it was a satisfactory one to advertisers is shown by the fact that one of the advertisers has just engaged the car for 15 days for special advertising. We believe that this is the first case in which a street car was built especially for advertising purposes.

PLATFORM PASSENGERS IN JERSEY.

The North Judson County Railway, of Jersey City, has a rule for prohibiting passengers riding on the rear platform under any circumstances. In the rigid enforcement of this rule James McCarthy, a passenger, was arrested for refusal to go inside the car which was fully seated, with several passengers standing. After paying fare, conductor ordered McCarthy inside. He refused on account of its crowded condition. The conductor thereupon called on a policeman to arrest the passenger, but on learning he had paid his fare refused to make the arrest. On reaching the elevated station a policeman was found who made the arrest and escorted the passenger to a station house. The officer in charge refused to book the prisoner, discharged him, and severely reprimanded the policeman. The conductor alleges the passenger gave utterance to "terrific oaths" after the first attempt at arrest, and under the circumstances we are

inclined to pass on the case as justifiable "oathicide." It is all very well to reserve the front platform, though there seems hardly any good reason in entirely excluding passengers, there; and of course a conductor should use common sense and not allow his rear platform to become so crowded as to interfere with movement of passengers to and from the inside of the car. But where gates are used on one side we can see neither sense or policy in excluding passengers from rear platform. If it is to be used only by conductor why build it at all; and go back to the omnibus step pattern. There was a time when a load on platforms seriously threatened the safety of a car and platforms frequently were broken off at the end sills of the car body, from overweight, but as cars are now built no such danger exists. Mr. McCarthy will sue the road for \$10,000 damages for arrest. The courts are usually quite generous in their interpretation of what are reasonable regulations to impose for the observance of passengers, but this can hardly be so construed; certainly when all the seats were occupied and standing somewhere was forced upon the passenger, through no fault of his, except that of getting on the car.

TROLLEY CAR HOLD UP.

On the night of October 7 an electric car on the Chicago North Shore Electric Street Railway was held up by five masked men, who robbed all the passengers, lacerating the ears of a woman whose diamond earrings were pulled through the flesh. Considerable money was secured. The robbers escaped in a surrey after they had pulled the trolley from the wire and cut the rope.

In order that REVIEW readers may know exactly what the situation was we reproduce from the Press and Mail the following extract from an editorial:

"In the excitement attending the robbery of the trolley car Monday night the world may have passed unnoticed the appearance of a new star of the first magnitude in the literary firmament. If so, we gladly adjust the glass that its full beauty and brilliancy may be revealed and enjoyed. The star thus illumines the scene of the robbery.

It was already dark. Back from the tracks loomed the hulky shadows that marked the location of houses. They reeled backward as the cars sped, streaked with light from their own windows. Overhead the moon scudded in a mottled sky. A keen wind piped down from the north.

"Are there any flies on that? What can surpass in graphic power the description of hulky shadows reeling backwards streaked with lights from their own windows? Under what spell except that of genius would an overhead moon scud a sky, with or without mottle? And hear the keen wind as it lead pipes down the turnpike from the north!"

The Denver Tramway Company has sued the Rocky Mountain News for \$100,000 damages for articles reflecting on the conduct of the railway in its defense of personal injury suits. T. M. Patterson, the editor, was arrested on a charge of criminal libel.

THE CONTINUOUS RAIL IN STREET RAILWAY PRACTICE.

A Paper Read Before the Engineers' Club of St. Louis, October 2, 1895, by

RICHARD M'CULLOCH, E. E., CITIZEN'S RAILWAY COMPANY, ST. LOUIS.



RICHARD M'CULLOCH.

In one of Jules Verne's stories there is very happily described the rivalry between an armor maker and a cannon manufacturer. Mix, forge, temper and chill as he would, no sooner would the armor maker turn out a piece of steel which was an absolutely safe covering for a warship, than the cannon maker would produce a gun to shoot through it. Much the same condition of affairs might be supposed to exist between the rail-mill and the car-factory.

In the horse-car days, flat, tram-rail laid on stringers was used almost entirely and when the girder-rail was rolled it was supposed that all that could be desired in the way of track had been produced. But when electric cars were put on the horse-car tracks and when the length of these cars was increased from 18 to 35 feet, the weights from 5,000 to 24,000 pounds, the speeds from 8 to 20 miles per hour and the head-way decreased from 5 minutes to less than one minute, the rail manufacturer found himself a thorough sympathizer with Jules Verne's armor-plate maker. For every inch that he added to the depth of his girder rail, and for every improvement in its manufacture, an additional length was added to the car and an additional weight to the trucks and motors.

The life of a girder rail is supposed to continue until the head becomes so worn that the flanges of the wheels begin to run on the tread. But as a matter of fact, few street railway tracks last until this takes place, for long before the head is worn off, the joints have become so rough that the rail must be renewed to save wear and tear on passengers and cars. No matter how carefully and skillfully the track has been laid, sooner or later the inevitable bump begins to notify the unhappy manager that his track is composed chiefly of joints. What to do is then a question. He may at quite an expense put a gang of men to work tightening up the fish-plates, shimming up the joints, putting stringers and steel plates underneath the rail ends, etc., but all this is necessarily slow and expensive work. Worst of all, it affords only temporary relief, for the very bump by which the joint first notified the world at large of its vitality, has flattened the ends of the rails so that the track is never again perfectly smooth at that point. This roughness soon starts the hammering action of the wheels and in a short time the joints again assert their presence. The science of invention has not been a laggard in this problem, for the records of the Patent Office will show that not even the flying-machine or street car fender has been a more popular subject than the invention of perfect joints.

Exactly who was the first man bold enough to suggest having no joints at all is hard to say, but it is pretty certain that the first experimenting in this line was done by Mr. Philip Noonan, a railroad engineer of Lynchburg, Va., who several years ago built about three miles of steam-railroad track leaving no openings between the rails and fastening the joints with hot-riveted plates. This track was in actual use for several years, and was the first demonstration of the continuous rail. Early in 1892, the Johnson Company, of Johnstown, Pa., under the leadership of its president, Mr. A. J. Moxham, began experimenting with the continuous rail. One rail of a section of track 1160 feet long was joined by heavy bars and machine-fitted bolts so that there was no possibility of movement. Carefully fitted wedges were driven into the spaces between the ends of the rails and every precaution taken to have the joint absolutely immovable. The other rail of the same track was laid in the ordinary manner with fish-plates and openings between the rails, so that any deviation of the continuous rail from a straight line would be noticed in the change of gage. The rail used was the Johnson 6-inch, 78-pound girder and the track was in actual use during the time of experimenting. At five points along the line stakes were set opposite marks on the rails, so that any change in the length of rail would at once be noticeable. Three times during the day and three times during the night, from March to September of 1892, temperature readings were taken of the following: air in the shade; roadbed at a depth of 7 inches, roadbed at a depth of 10 inches, head of girder-rail and base of girder-rail. Observations were also made at regular intervals of the position of the marks on the rails with reference to the stakes. Briefly summing up the result of the experiment, we may say that the temperature of the rail followed very closely the temperature of the air, being slightly colder than the air during the day and slightly warmer during the night. The road-bed, being a poorer conductor of heat than the rail, was less affected by the changes of temperature of the air. During the period of experiment, the air temperature varied from 10 to 89 degrees, and absolutely no movement could be detected in the rails, either longitudinally or laterally. This experiment satisfied the Johnson Company that the continuous rail was practicable; and having proved its feasibility they at once set about finding the best method of uniting the rail ends. This was the first thorough and scientific experimenting done in connection with continuous rails; and, whether or not the particular method of connecting the rail ends advocated by the Johnson Company is the best one, all honor is due the officers of this company for the contribution they have made to the knowledge on the subject and the unselfish manner in which they have disseminated it.

ELECTRIC WELDING.

The method adopted by this company for connecting the rail ends was that of welding them electrically. A machine for this purpose was built by the Thomson Welding Company, and in the spring and summer of 1893, about three miles in Johnstown and about eight miles of track in Boston were electrically welded. During the winter of 1893-4 about six per cent of these joints broke. Having remedied some apparent defects in the method, the Johnson Company in the spring of 1894 sent their machine to St. Louis, where $6\frac{1}{2}$ miles of track were electrically welded. From St. Louis the machine was sent to Cleveland, where about 5 miles were welded and then to Brooklyn, where 32 miles of track were joined together by this method.

The first track electrically welded, that is, that in Johnstown and Boston, was not welded directly at the joint but the rail ends were joined on each side by means of a span which was welded to the web of the rail about four inches back of the end. The breaks did not occur at the joint or in the span, but the rail itself broke where the span had been welded on. This was supposed to be due to the fact that when the rail at this point cooled after the welding process, internal strains were produced which seriously impaired the tensile strength of the rail at this point. A new form of joint was devised by means of which an actual butt weld is made at the joint, and this is the method which has been applied in St. Louis.

The Baden Division of the St. Louis Railroad Company, where the electric welding in this city was done, consists of $3\frac{1}{4}$ miles of double track and extends from the northern end of the Broadway cable to the vine clad hills of Baden in the extreme northern part of the city. The track throughout is laid in a macadam street, no paving being used either inside or outside the rail.

WELDING CIRCUIT.

A brief description of the welding apparatus will be given. This is mounted on a car having its own motors and controlling apparatus, so that it may move along the track by means of the trolley current.

For the welding, the current passes through an automatic circuit breaker, switch, ammeter and starting rheostat to a rotary transformer which converts from 500-volt continuous to alternating current. The transformer is an ordinary four pole, General Electric, 100 kilowatt dynamo. To obtain the alternating current four leads from the windings are taken off at equal distances around the armature and led to the two collector rings on the armature shaft. The speed of the transformer is about 1,100 revolutions per minute, so that the periodicity of the alternating current is about 4,400 per minute. The alternating current from the collector rings passes through a reaction coil with a movable iron core to the welding machine. This is on the end of the car and is hung on a crane so that it may be set over either rail. It works on the principle of the well-known Thomson welders, and is simply an alternating current transformer on a large scale in which

the rail joint completes the secondary circuit. The insulation of the coils is paraffine oil, and the secondary consists of an enormous bundle of sheet copper strips. These strips lead to two contact plates between which the welding is done. The distance between the plates is controlled by a toggle joint operated by a screw, so arranged that by a slight turn of the screw, a great pressure may be brought to bear on the weld. In addition to this circuit, the welding car contains a motor for driving the crane and another which operates a pump for circulating water in the welding machine. The car is very heavy, weighing about 30 tons when equipped for work. The outfit also includes a small car which carries two motors, operating emery wheels for polishing the joints, preparatory to welding.

The connection between the rail ends is made by lugs welded to the web of the rail. It is intended that enough plastic steel shall enter the joint to make a butt weld and that additional security is afforded by the lugs welded to the web. There are four lugs used at each joint and two welds are necessary, the bottom two being welded in one operation and the upper two in the next. During the welding operation which lasts from one to two minutes, the direct current transformer takes from the line about 250 amperes at 500 volts. This is transformed down in the secondary of the welding machine to about four volts. The current which passes through the lugs on the rails is consequently 20,000 to 30,000 amperes.

The operation of welding is as follows: The ends of the rails are butted together by driving a wedge in the joint ahead, and the welding car is run over the joint to be welded, the welding taking place in the rear of the car, so that it is never necessary to run over a hot joint. The webs of the rails are polished with emery wheels for about two inches to each side of their ends. The joint is clamped by means of a gun-metal casting, which holds the rails in proper position while the weld is being made, and the bottom lugs are then placed in position and the contact clamps screwed down upon them. The circuit through the secondary winding of the welder being thus completed through the lugs, the switch of the welding machine is closed and the iron core of the reaction coil slowly raised. Almost instantly a dark, ruddy color appears in the lugs which gradually brightens until the welding heat is reached. A quick turn of the screw which operates the toggle joint brings the lugs firmly up against the rail and forces the plastic steel into the joint between the ends of the rails. The upper lugs are quickly inserted, the contacts screwed down upon them and the welding performed in the same manner as in the case of the lower ones. A piece of carbon which has been placed on top of the rail before this operation, keeps this surface smooth and at the same time carbonizes and hardens the rail at this point. As has been stated, from one to two minutes are consumed in making each weld, but the greater portion of the time is taken up in preparing the joints, moving the machine and setting up the welder. While in St. Louis, the machine completed 30 to 50 joints per day of ten hours.

Since this work has been done, the Johnson Company, has built two more welding machines, in which some improvements have been made. Instead of placing both the rotary transformer and the welding machine in one car, they are now put in separate cars, connected electrically by cables. This makes the machine easier to handle and distributes the weight over a greater distance on the track. A hydraulic jack has also been substituted for the toggle joint used in forcing the lugs against the rails. The electric welding done by the Johnson Company, in Brooklyn, after leaving St. Louis, was on 9-inch rail laid in paved streets. The track work was entirely completed and paved up before any welding was done. When the machine arrived the paving was taken up where necessary and the joints welded, leaving every third joint open. This was done in order to allow the rails to expand under the heat produced in welding. At night the welder was taken over the same track and this third joint welded.

CAST-WELDING.

As soon as the fact was demonstrated that a continuous rail buried in the ground was a possibility, other methods besides the electric welding of the joints were proposed. The particular one which will be described

1894-95, but at present the cars of the Southwestern Railway are running regularly over this route.

On account of the excellent record made by this track during last winter, the officers of the Citizens Railway Company, of this city, decided in relaying the old cable track, to use the cast-welded joint. As many new problems in street railway track construction have arisen during the progress of this work, a brief description of some of the methods employed may not prove uninteresting.

The Citizens Railway, as all of you are aware, was built as a cable road nine years ago. The original cable track consisted of $9\frac{3}{4}$ miles of single track, and was laid with 4-inch, 52-pound, Johnson girder-rail, which was the heaviest section rolled at that time. The rail was supported on cast iron yokes, four feet apart and imbedded in concrete. Last fall it was decided to operate the road by electricity and on the first of January the cable power house was shut down and the electric cars started. The rail adopted for the new track was seven inch, 85-pound, Johnson girder, to be delivered in lengths of 60 feet. Two special trussed wagons with wheel-bases of 45 feet were designed and built for the hauling of these rails. The curves were made of six inch, 97 pound, girder-rail, and all curves of less than 400 feet ra-



WAGON FOR HAULING RAILS.

here is what is known as the "cast-welding" process and is being exploited by the Falk Manufacturing Company, of Milwaukee. This, to briefly describe it, consists of clasp ing the ends of the rails for about 8 inches on each side of the joint by means of a mold, and then pouring the mold full of molten iron. The iron solidifies on the rails around the joint and makes a partial union with it.

In order to compare the two methods, the St. Louis Railroad Company, in the fall of 1894, had 3 miles of track in the southern part of the city connected by the cast-welded process. As the furnace was not ready at the time the rails were laid, the track work was finished and the trench filled in, leaving the joints temporarily connected by fish-plates. Some three months later when the furnace arrived, the macadam around the joints was dug up, the fish-plates removed and the rails united by means of the cast joint. The track was laid in July and August, and the rails were welded in October and November. No cars were operated over this track during the winter of

dius were designed with a spiral casement on each end and were double guarded. Curves of 400 to 1,200 feet radius have a guard rail on the inside only, while those of still greater radius are sprung from the straight rails. As the new rail was three inches deeper than the old, it was impossible to lay it on the old yokes even if it had been advisable to do so. The ties are laid two feet between centres and in order to make room for them and the 7-inch rail, it was necessary to take out about 12 inches of the solid concrete in which the yokes were imbedded as well as to break off the yokes at this point. How to do this in the quickest and most economical manner possible was a problem. As it was necessary to abandon a portion of the road during construction, and as this line has a large passenger travel to take care of, speed in reconstruction was of the utmost importance. After quit a little experimenting, the plan of blasting out the concrete with dynamite was adopted. Two holes are drilled between each pair of yokes on each side of the track by means of a portable steam drill. An Ingersoll-Sargeant

drill is used and the steam is obtained from a 6-horse-power boiler placed in a car on the old track. Connection is made from the boiler to the drill by means of a



PORTABLE STEAM DRILL AND BOILER.

steam hose. The holes are drilled as nearly as possible directly over the center of the block of concrete and are seven inches deep. The drill is operated from 5 a. m. to 9 p. m. by two shifts of men. The number of holes drilled per day varies from 300 to 700 according to the nature of the concrete. Each hole is loaded with one-tenth pound of 40 per cent Aetna dynamite. Common sand is used for tamping and from 8 to 12 holes are fired at once by means of a magnet. In order to prevent all danger from flying particles, an old car especially prepared for this purpose is placed over the holes before shooting. This car has been strongly braced and floored with ties, and is provided with heavy side-boards which are lowered before firing, thus forming a completely closed space over the charge. Blasting with this outfit has been done in the narrowest streets in the heart of the city and up to this date no accident of any kind has occurred. Considerable experimenting was done in order to find out how deep to drill the holes and how much dynamite to use. The quantity adopted will just shatter the top of the con-



BLASTING CAR—CITIZEN'S RAILWAY, ST. LOUIS.

crete so that it may be picked out in large pieces, leaving the concrete unbroken twelve inches below the surface, thus affording a solid and substantial foundation for the ties. The bottom of the conduit is filled with fine, broken concrete, mashed in and thoroughly rammed, before the ties are laid in the trench. Having prepared the roadbed in this manner there remains beneath the ties a solid block of unbroken concrete, of the width of the track and over two feet in thickness. After excavating the trench the track is laid, joined together temporarily by fish plates, tamped, lined, surfaced and completely finished in every particular before the joints are cast. The apparatus for casting the joints consists of a cupola furnace mounted on a heavy truck. The cupola is two feet in diameter, brick lined, and the blast is furnished by a No. 5 Sturtevant blower, driven at 1800 revolutions per minute, by a 5-h-p. motor, which receives its current from the trolley. The cupola is operated as is usual in a foundry and the iron used is one-half best soft gray pig and one-half selected scrap. The scrap consists of old gear wheels, man-hole covers and frames, an abundance of

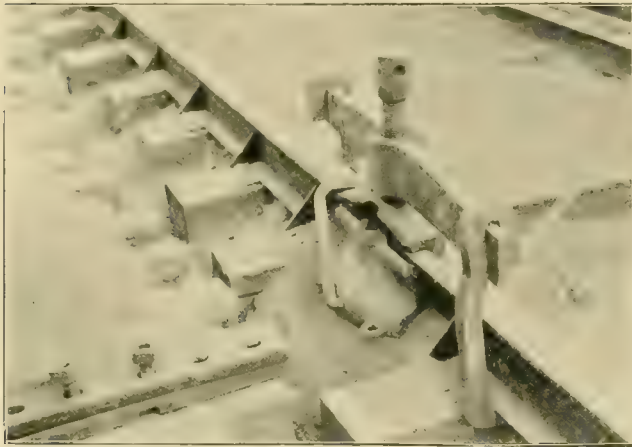


PORTABLE CUPOLA FOR CASTING JOINTS.

which are found in the scrap heap of the railway. The furnace works very rapidly and in twenty minutes after the blast is turned on the iron is ready to pour. It may then be tapped as long as the charging is continued at the top. As the machine has been operated on the Citizens railway, about twelve hundred feet of track has been prepared and all the joints moulded in one heat. As many as seventy-two joints have been poured at one melting and it is probable that ninety or one hundred could be made before shutting down the furnace to renew the lining.

The preparation of the joint for casting is as follows: The fish-plates are first taken off and the rail ends for about 8 inches back polished with garnet paper. If there is any opening between the rails it is closed by shims. The molds consisting of two castings made to fit the rail are then placed about the joint and clamped in position. A heavy clamp is placed on top of the rail and screwed

up as tightly as possible to hold the joint immovable while being poured. This clamp is left on the rail until the casting has cooled. Preparatory to the pouring



JOINT PREPARED FOR CASTING.

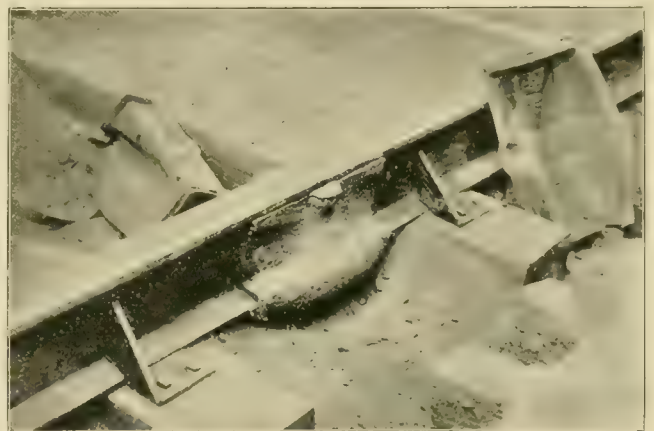
the moulds are lined with a mixture of linseed oil and plumbago and are heated to drive out any moisture in them or on the rail. The pouring operation is very simple. The melted iron is run from the cupola into a ladle and then slowly poured into the mold. This final operation is very quickly performed, as it usually takes only about three hours to pour forty joints. The casting weighs one hundred and thirty-seven pounds and extends back on the rail seven inches taking in two of the bolt holes in the ends of the rails. In this way four bolts are cast through the rail. It is undoubtedly the case that a sort of welding action takes place between the iron and the steel rail, as on examination of a joint sawed in two it will be difficult to tell the exact junction of the iron and the steel.

RESULTS OF EXPERIMENTS.

Having described the modes of applying these two processes, let us see what they have done in actual operation. The Baden road, constructed in the spring of 1894, which had its rail ends connected by the electric method had in all 2,203 joints and of these 72 or 3.27 per cent have broken. Thirty-seven broke during the cold weather of the first part of the winter and these were repaired by the cast-welding method. During a later cold snap thirty-five more were broken. These have not yet been repaired. During the heat of the summer no trouble whatever was experienced with the alignment of the track. From the weather bureau reports the average temperature while the construction was in progress was 63 degrees, ranging from 14 degrees as a minimum to 99 degrees as a maximum. During the last winter the lowest temperature was 12 degrees below zero and the hottest day in the summer was 100 degrees, making the range of temperature through which the track has passed 112 degrees, or a maximum deviation from the average welding temperature of 75 degrees. Seven of the joints on breaking opened nearly 2 inches, but in many the opening was so

small as barely to be perceptible, the average opening being about one quarter of an inch. During the warm weather of this summer the openings were diminished slightly but the openings have never completely closed. Every joint which has broken has shown itself to be an imperfect weld. There has never yet been an instance of a good weld breaking. In all cases, the rail ends have simply pulled apart, the lugs sticking to that rail which held them tightest. In a few instances small pieces of rail pulled off with the lugs, but in no cases have the rails themselves broken and we have never had a joint to break which looked as if it had ever been really welded. There are several reasons for this. On account of the great distance from the power house, the voltage was necessarily low while the weld was being made. The work at that time was new and not very well understood; and the workmen who had the machine in charge were often careless and hurried. The result of this experiment is far from being discouraging and the officers of the railroad company are satisfied that with the additional knowledge we now possess, and with the improvements which have been made in the welding machine by which a fairly constant voltage is maintained while the welding is in progress, that it is possible to construct a track by this method with an insignificant trouble from breakage.

In regard to experiments elsewhere, Mr. C. W. Wason, electrical engineer of the Cleveland Electric Railway Company, has been kind enough to furnish information as to the results obtained in Cleveland. During the summer of 1894, 3400 joints were made electrically, two thirds of which were on 56-pound rail and the remainder on 90-pound rail. Of this number, the total breakage during last winter was six, four of them being on 56-pound rail and the remainder on 90-pound rail. The percentage of breakage was 0.18 per cent



CAST WELDED JOINT COMPLETED.

which is a much better record than that made in St. Louis. All the joints which broke showed themselves to be imperfectly welded. Mr. Wason expresses himself as highly in favor of the electric method of welding and states that the breaks and rough joints on his track were due to carelessness on the part of the workmen operating the machine.

The cast-welded track of the Southwestern Railway on Chippewa street was welded during the months of October and November of the same year. The average temperature while this work was in progress was 51 degrees with a maximum of 84 degrees and a minimum of 18 degrees. There were 744 joints in all and during the winter only three or 0.43 per cent broke. As stated in the case of electric-welded track, no deviation whatever has been perceived in the alignment. Since this track was laid, the temperature has ranged from 100 degrees as a maximum to 12 degrees below zero as a minimum, a range of 112 degrees and a deviation of 63 degrees from the welding temperature.

The Falk Manufacturing Company who are making the cast joint have this summer operated in Chicago, St. Paul, Minneapolis and Newark, besides the work done in St. Louis. In Chicago, for the Chicago City Railway, 11,903 joints were made on 4½ and 7-inch rail, and for the West Chicago Street Railroad Company, 8,867 joints were made. In St. Paul, Minneapolis and Newark, work has recently begun and up to the present time about 2,000 joints have been made in each place. The results so far have been very satisfactory both to the railroad companies and to the contractors.

It seems difficult to those accustomed to steam railroad tracks to reconcile themselves to the use of a continuous rail. They instinctively call to mind certain experiences they have had with rails creeping and getting out of place on account of temperature variations. It must be remembered, however, that street railway tracks differ in one very important particular from those of the steam railways, that is in having a road-bed firmly packed about the rail. The perimeter of a 7-inch rail is 29 inches of which only 6½ or 22.4 per cent is exposed to the air, while the remaining 67.6 per cent is covered up and firmly gripped by the road-bed. No one can understand how firm this grip is, who has not seen a rail which has lain in a macadam street several years taken up, when the whole buried surface of the rail is found to be covered with a hard cement composed of stones and mud requiring considerable work with a pick to remove. There is a great tendency on the part of the rail to change its length with the temperature variations but there is also the ability of the road-bed to hold it in place.

CALCULATION OF STRAINS.

The strain on rails due to the variations of temperature may be estimated as follows. Assuming a co-efficient of expansion for steel of 0.000065 and multiplying this by 75 which is a liberal figure for the number of degrees of maximum deviation from the welding temperature, we get 0.000487 which is that part of its length which a rail would expand due to a rise of 75 degrees, or contract due to a fall of 75 degrees in temperature. A steel bar will expand 0.00003 of its length due to a load of 1,000 pounds per square inch. Dividing the estimated expansion by this figure we get for the strain 16,200 pounds per square inch. As the rail is 8½ inches in cross section, the

total pull due to a fall of 75 degrees in temperature is 137,700 pounds.

As 40,000 pounds per square inch is a safe value for the elastic limit of steel it can readily be seen that in this climate at least the elastic limit will never be reached, and this means that these expansions and contractions may go on indefinitely, and as long as the joints remain unbroken no harm will be done to the rail for it is a well-proven fact that stresses within the elastic limit work no harm.

Assuming 80,000 pounds per square inch as the ultimate strength of steel, we see that so far as the strength of the rails themselves is concerned, we have a factor of safety of five.

An interesting calculation may be made showing the friction with which the rail is held by the road-bed. Taking the figures for the contraction of the rail due to a fall of 75 degrees in temperature, each rail of the Baden track should have contracted 8 feet 6 inches. As a matter of fact, when the joints broke the openings in none of these exceeded two inches and the combined openings of one rail the length of the road did not exceed six inches. This would seem to show that the pull which broke the joint was not a transmitted, cumulative effort extending all along the line but was more the result of a local strain, not extending for a great distance on either side of the joint. Reasoning from the same data. It would appear that the strain at other points along the track has not been relieved, and that the joints at these other places have shown themselves strong enough to endure the pull.

The strength of the cast iron joint may be shown to be fully equal to the strength of the rail. The area of its cross section at the joint is 61.6 square inches. In order to make a perfectly safe estimate, let us assume that its cross section is reduced 25 per cent, or to 45 square inches by blow holes and imperfections. Taking for the tensile strength of cast iron 18,000 pounds per square inch, we have as the ultimate strength of the joint 810,000 pounds which is largely in excess of the strength of the rail.

COMPARISON OF METHODS.

The two methods just described are the only processes of actually welding rails yet put into operation. The electric welding is scientifically a beautiful process and when skillfully done we have no hesitation in saying that the joint is stronger than the rail itself. It has the disadvantage, however, of requiring considerable care and intelligence to operate it, qualifications which are sometimes difficult to find in workmen. It is also impossible to tell simply by looking at a joint whether or not it is really welded. On ordinary railway circuits when the voltage fluctuates continually it is difficult to operate the processes successfully. This, however, it is proposed to remedy by using a storage battery, which takes current from the line when the welding machine is idle, but which is thrown into parallel with the line and assists in maintaining the voltage while the welding is in progress. The welding machine with its accessories is exceedingly

heavy and cumbersome, and difficult to move from place to place where track is not already laid. The great expense of an outfit prohibits almost any railroad company owning one and this complicates the question of repairs, for if the machine is gone and some of the joints break, how are they to be repaired?

Without wishing to make any invidious comparisons, it would be well to call attention to some of the advantages which the cast-welding process possesses. The first is, the relative simplicity and cheapness of the apparatus employed and the ease with which men may be procured who are used to this kind of work and capable of doing it well. The machine is not very heavy, it does not run on the track and can be transported easily and quickly from place to place. While as yet no difficulties have developed, the weak points of the process would seem to be: First, that the joint is a casting, subject to blowholes, chilling, imperfections and all the ills of a casting, any one which might greatly impair its tensile strength; and second, the fact that the steel rail and the cast iron joint possess different coefficients of expansion and that under variations in temperature internal strains might arise in the joint itself, which might finally result in its rupture. As has already been stated, however, no troubles of this kind have as yet developed, and these are merely considerations which suggest themselves in the examination of the process.

The cost of either of these methods is not greatly in excess of the old fish-plate method, but even if it was, the advantages gained by the abolition of joints would be of such value that no progressive railroad man would hesitate on that account. If either method will remedy for all time trouble with joints, the cost of repairs to the track after being down a few years, if laid with fish-plates, would soon pay the extra first cost, without considering the prolonged life of the rolling stock, and the prestige given to the road on account of its smooth riding track. If joints are abolished, the life of a track instead of being limited by the life of the joints will be the life of the rail itself, and this will far out-weigh any considerations as to the cost of making the joints.

An additional advantage which should be mentioned is that any form of welding obviates the necessity of bonding the joints of electric roads. Tests which have been made on welded joints show that the electric conductivity of the joint is as great as that of the rail itself. Assuming the conductivity of steel to be one-seventh that of copper, an 85-pound steel rail would have a carrying capacity equal to a copper bar 1.2 square inches in section, or as feed-wire is usually rated, of 1,500,000 circular mils. A double track consisting of four of these rails would thus have a conductivity equal to 6,000,000 circular mils. This is largely in excess of the feeder section of any one line of railway in St. Louis. For instance, the combined section of the feeders which run to the Citizen's line, which was calculated for sixty cars allowing a drop of fifty volts at full load, is 3,200,000 circular mils. To one who is engaged in the actual operation of street railways this means a great deal. Given a

track with a conductivity equal to that just cited, it is necessary only to establish a low resistance connection between the rails and the bus-bar in the power house, when all the troubles due to low voltage along the line, and all the dangers of electrolysis would be a thing of the past.

It is not to be supposed that the millennium in track construction has already been reached, but what has been demonstrated is this: First, that the use of a continuous rail for street railway practice is feasible, and second, that it is possible to make joints of sufficient strength to stand changes of temperature. Whether new difficulties will develop remains for the future to show, but let us hope that those of us who have placed our faith in rail-welding will not share the fate of Jules Verne's armor-maker, who planned, mixed, forged and tempered his best only to see the triumph of his skill shot to pieces by the latest gun of his hated rival.

JOHN C. DOLPH.

John C. Dolph, manager for the eastern district of the Forest City Electric Company, who has recently been working up such a good business for "Roll Drop" commutator bars, and whose portrait accompanies this sketch, began his electrical career with the Brush Electric Company at Cleveland in 1887. After three years with this company and upon the incorporation of the Short Electric Railway Company he accepted a position with the latter concern, remaining in Cleveland until 1891 when he was transferred



JOHN C. DOLPH.

to the New York office of the same concern, continuing with it until the consolidation with the General Electric Company. He then was for two years eastern agent for the Eureka Tempered Copper Company. He is now the exponent of "Roll Drop" commutator bars and has succeeded in working up a good trade in the east which is constantly increasing in volume. The merits of the Forest City Electric Company's products are becoming rapidly recognized by the numerous large street railways in the east. The "Roll Drop" bar, being hit up in a die, cold, is claimed to be tougher than a hot forged bar.

AMMONIA MOTOR AGAIN.

The Standard Fireless Engine Company, New Orleans, is still trying to promote an ammonia motor for street cars. Recently 174 shares of its stock were sold at \$2 per share to raise money for experimental purposes. At a recent meeting 1,265 shares were taken at \$1 per share, but the company is still shy a thousand or fifteen hundred dollars. Ammonia, as a street car motive power, offers about as little promise of success as anything we know.

LOOK OUT FOR THIS MAN.

William Mason, alias William Langley, alias DeWolf, etc., is now serving a 60-day sentence in the city jail at New Orleans, in default of payment of a \$25 fine for proposing to sell a device for beating fare registers on street cars. The police record says he is 30 years old; 5 feet 8 inches high; weight, 138 pounds; build, slim; eyes, brown; hair, dark; wears moustache; and he is decidedly bald, as can be seen from his photograph. Mason has operated in the east and it is reported that he victimized several companies, but the officials of the New Orleans City & Lake Railroad Company and the Crescent City Railroad Company, New Orleans, were too much for him.

About the middle of September Mason appeared before one of the officers of the company, and informed him that for a consideration he could give information as to a method employed by the conductors to beat the fare registers. He claimed that a device, which could be fastened to the register and made to act upon the totalizer in such a manner as to reduce its reading any number desired, was in the possession of five of the company's men that he knew of. That

he was a private detective and had seen the thing work and for a consideration would undertake to secure a machine, demonstrate its workings, proving that the totalizer could be set back without any injury whatever to its mechanism, after which he would take a position on the line upon which these five men were employed, secure their confidence and give all the information necessary to secure their arrest with the devices in their possession. He demanded \$300 down when he showed its workings, and \$200, when the job was finished. The company did not bite. A day or two after his interview, it was discovered that Mason had offered to several of the men the same thing, asking \$10 each for the devices and explaining how nicely they could be worked.

The company then decided upon his arrest, hoping to secure his stock in trade which had never been exhibited to the officials or any of the employees. This was accomplished after considerable difficulty but nothing was discovered except letters and papers showing similar practices in New York and Boston, and several first class letters of recommendation from responsible persons in

these cities, which letters it has since been learned are bogus.

Mason was sentenced to jail as a vagrant, there being no statute covering a case like his under which a severer punishment could be inflicted. Information has been received that he has operated with several accomplices in the east and succeeded in securing several hundred dollars from a New York city road with the same tactics he used at New Orleans.

A positive statement that registers can be tampered with, accompanied with the bold offer to demonstrate the fact, coming from a shrewd and well appearing man, is calculated to excite the keenest interest of any manager, and it is upon the doubts he is able to raise in the officials'

minds, that this fellow practices and endeavors to secure a cash retainer, and then leaves for other fields. The New Orleans street railway officials have the greatest confidence in the fare registers in use on their lines, and have no evidence whatever that they can be tampered with, for this reason Mason's proposition was not considered. It was unfortunately not discovered, whether Mason had some mechanical device, as he claimed, or whether he was making a false pretense in



WILLIAM MASON, ALIAS LANGLEY, ALIAS DEWOLF.

Tried to sell Devices for beating Fare Registers.

order to obtain money from the company. The discovery warns managers to be on their guard.

ELECTRIC PACE MAKER.

When the yacht race was sailed last summer, hundreds of steamers accompanied them from start to finish, in order to give thousands an opportunity to witness every detail.

The Oakland, San Leandro & Hayward's electric line, running 30 miles out of Oakland, Cal., is built on one side of the smooth level road very like a boulevard. Recently a bicycle race was planned to be run on this road. The superintendent, with an eye to business, advertised a special train, which was given the right of way the entire distance, and passengers were thus right in the race all the way. Towards the finish the electric train made a spurt in order to get ahead and come to a full stop as the racer crossed the line. The suggestion is an excellent one and offers a chance for many roads to work up a similar novelty. Of course an extra high fare was charged for seats in the special train.

FOURTEENTH ANNUAL CONVENTION OF THE AMERICAN STREET RAILWAY
ASSOCIATION.

Montreal, October 15, 16, 17, 18, 1895.

Evidently the members of the Street Railway Association were glad to visit Montreal, for never in the fourteen years of its history had so many delegates arrived so early. All day Monday, railway men came pouring in and towards evening the Chicago special arrived with its big delegation, having made the run from Chicago to Montreal over the Wabash and Canadian Pacific in 23 hours. A good part of the way a speed of 60 miles an hour was maintained. Later in the evening the New York special over the New York Central arrived and the association members were in evidence everywhere. Members of the local committee met visitors at the depots and with the least possible delay directed them to their hotels where rooms were already waiting. During the evening new acquaintances were quickly made and old ones renewed, so that on Tuesday morning nearly everybody had met everybody else and the best of feeling was established. At the exhibit hall the edict was that all displays must be in readiness by Tuesday morning, and never before had the exhibits been in place so early, although a large force was busy all Monday night in order to comply with the requirement. It was, however, demonstrated that exhibits can be set up by a fixed hour, and it is to be hoped this good resolution will hereafter prevail. Hotels, depots, meeting hall and exhibit rink were all within a few steps, which greatly facilitated getting from one to the other.

The attendance and number of exhibits were each surprisingly large considering the remote distance and unavoidable difficulties in crossing a custom line.

The city was extremely interesting and furnished points of interest which demanded more time than even the spare hours of four days permitted. In the matter of papers read, the program was very disappointing; the reports read were few but good. The internal storm which has been brewing for three years broke in a regular gale, and occupied practically all the time and attention of members; most of the sessions being behind closed doors. At times the heat of debate approached the cyclone point, but good judgment and common sense prevailed.

The sky has been cleared of clouds, and the old ship gallantly weathered the storm and sailed into calm waters. While the two sides most earnestly contended for victory, no personal animosities were engendered and each came out with good feeling for the other.

The association was confronted with a debt of over \$4,000, which was more than raised and its finances placed on a business basis. In the distribution of offices the presidency went to the east and the office of secretary-treasurer was given the west. The banquet was a pleasant affair and over at a seasonable hour. The dinner was quite ordinary but well served, and the toasts fairly good. The failure to provide any means of warming the exhibit hall caused actual suffering to the supply-

men, and combined with prolonged executive sessions kept railway men away to an extent never before occasioned. In the entertainment of the ladies nothing whatever was provided beyond street car fare, and was a matter of much unfavorable comment. The fact that an impression had gone out that it was a convention of street car employees, is no excuse. Altogether the convention was the least successful of any during the past ten years; a combination of circumstances seemingly conspired to defeat its best opportunities. Notwithstanding all this there was much to be thankful for, and the meeting should not be regarded as a failure. The relations between the two countries so far as those present was concerned, have been strengthened, and each knows the other better for the going.

Welcome by the Mayor.

Attended by his suite, his worship, Mayor J. A. Villeneuve, marched down the center aisle, the delegates rising and remaining standing until the mayor had taken his seat upon the rostrum. He was then introduced by the chair and welcomed the delegates as follows:

"Mr. Chairman and gentlemen:—It is to me a pleasant task, as mayor of this city, and on behalf of the citizens of Montreal, to extend to all a most cordial welcome. You have assembled in our midst to hold the fourteenth annual meeting of your organization and I assure you that our city considers itself honored by your presence. Your association, considered in its object, and in the result of its labors, is undoubtedly one of the most important of the American continent, and so rapid has been the development of the electrical industry that few have been able to keep track of its achievements. Its improvement has been a wealth producer; it has cost individuals and communities large sums of money, but this in every case has produced more than the cost, and it has been cheaper to have these improvements than to do without them. This fact cannot be questioned, and the isolated cases of failure in experiments, or poorly calculated investments, are but the sacrifices by which the general good has been advanced. I think I may venture the statement that the electrical industry has produced more changes in the American service and convenience of civilized life than has ever been caused by the use of any other method or force, subject to the service of man.

"There is probably no application of electric power which has attracted closer attention from those whose interest is affected by it, than its use for operating street-railways and in no other branch of service has electric power achieved a more brilliant success. I therefore beg to congratulate you, gentlemen, because you are members of an association whose object is to develop, confirm and extend such an important industry, and I pray you to consider yourselves at home in our city—the metropolis of Canada. I trust your convention will be fruitful, and

will result in benefit to yourselves as a body and to the community at large. Rest assured that, one and all, the citizens of Montreal appreciate fully the honor you have done them in selecting their city as the scene of the present convention; and they trust that when you return to your homes you will take back with you pleasant and lasting memories of Montreal." (Applause.)

President Hurt Replies.

"Mr. Mayor: On behalf of the members of the American Street Railway Association I thank you for this welcome. Such generous words of greeting are to be taken as sufficient license to see and enjoy all that is to be seen in your beautiful city. This association represents one of the great industries of the country. Its members are called upon to daily meet grave and perplexing questions, and probably in that direction it taxes its managers more than any other line of work. Some of these problems will be discussed in our meeting, and we invite you, sir, to be present during the deliberations of this body."

The Mayor's welcome was heartily supplemented by Alderman Stevenson, a jolly Scotchman, who quickly won the hearts of all.

Col. S. C. Stevenson's Remarks.

"I arrived late last night from a long railway journey of a couple of thousand miles, and attended a meeting of the corporation which usually is not a very, well,—agreeable business, and sometimes it is,—but last night it was not. I did not have a very good night's rest, and when I was asked by the mayor to assist him in welcoming the body here assembled, I thought it was putting too much on one pair of shoulders. But they are broad and have stood a good deal, and will get through this undertaking. His Worship, the Mayor, has extended the welcome of the citizens. This welcome is one that is always accorded—in the hearts of our citizens a most cordial one—to any organization such as this association, which assembles for the good of the community. We are in the habit of looking upon electric railways as being organized more for their own benefit than the benefit of the public, but that is a fallacy, you know, like many others that obtained credence for a while, but by and by the people will learn better, (laughter.) I am glad, however, to hear that your president says that you intend to see all that can be seen in our good city. Gentlemen, I hope you have brought a change of linen with you, because it will take you a couple of weeks to accomplish this.

"You are just as welcome as if you were in your own city, and if you enter any of our homes, you will be as gladly welcome as at your own fireside. You have fallen into good hands, considering that you are in the city of Montreal—a city that can undertake anything in the way of receptions and usually carry them out in a style not second to any I have ever seen anywhere else. But even if the citizens do not do their full duty, you have fallen into good hands—the Montreal Street Railway Company—whose officers will no doubt treat you as well

as they are treating the citizens at present, and if you are as well pleased with their efforts as the citizens are, I think you will have no ground for regretting that you came to this good city. (Applause.)

"This is an organization which was severely handled at a meeting I attended last week at Augusta, Ga.,—the International Association of Fire Engineers. It seems you are a dangerous sort of people after all. In one of the papers read we were told that we would not have any water supply, because electrolysis will eat away all the pipes, both gas and water, and we will have neither light nor water. That will be a sad state of affairs, I am sure you will admit; but whether it is true or not I do not know. I am sure that if there is any way by which such interference with gas and water pipes can be averted you will be glad to employ any means necessary. I hope, you will be able to get some means of locomotion which will do away with that idea, so that the running of the cars will not in any way affect the water or gas pipes of the city.

"If there is anything we have not done that you would wish us to do—I mean as citizens—I was introduced as an alderman, which is perhaps not the very best kind of a recommendation (loud applause) but you know there are aldermen and aldermen. But if there is anything that we, the good aldermen, can do for you we will be very glad to do it. Mr. Lusher, Mr. Cunningham and the rest of the gentlemen connected with your organization have not been backward in the past in making their wishes known. To save your modesty, I am sure they will be glad to make such applications as may be necessary, and the application, whatever it may be, is certain not to be unreasonable, because the street railway company's applications heretofore have not been very unreasonable—from their point of view, but whatever they desire to be done for the comfort, convenience and pleasure of the gentlemen assembled at this convention, we will all be very glad to do it. I hope you will enjoy yourselves here, and go back to your homes with pleasant recollections of your visit." (Applause.)

Then followed the annual address of the President of the Association:

President Hurt's Address.

"Gentlemen of the Association: You are for the first time assembled in convention beyond the confines of the States, and by this meeting on Canadian soil the lesson is taught that the association is endeavoring to extend and receive the benefits of fraternal intercourse and broad educational work.

"In this most beautiful city, situated in a profusion of nature's gifts to men, an examination and contemplation of all that may be interesting would render your limited stay most enjoyable indeed. We hope you will enjoy your visit to the city of Montreal where you are now in convention in response to that noble fraternal spirit characteristic of the members of this association throughout its entire field of operations, and which I am proud to say is so marked in our brethren in Montreal. Let us not

forget, however, that we meet also for practical, useful work and that you are at this convention confronted with grave questions to be determined.

"Before referring to matters which are in order, and which should engage your special attention, I feel constrained to speak in commemoration of the papers presented at the last annual meeting, and to invite your attention to them. I refer especially to the paper on "Uniform System of Railway Accounts" by Mr. H. I. Bettis, the paper on "City and Suburban Electric Railways" by Mr. E. C. Foster, and the paper on "Mail, Express and Freight Service on Street Railway Cars" by Mr. Richard McCulloch. While all the papers read bear evidence of much thought and merit, the three mentioned will be found especially useful.

"The street railway problem of to-day is growing in importance more rapidly and is attracting to a study of its solution a greater number of educated men than any other branch of industrial work. But a few years have sufficed to transform a business of dull drudgery and routine in which animal power was resorted to chiefly, into a business in which the mysterious power electricity, but by a distinguished scientist denominated "God's Vicegerent," works a man's bidding on all sections of an immense system with instantaneous promptness. The usefulness of this subtle force is only equalled by the charm of its contemplation, and the ablest men of the day give homage to a business which invokes its application.

"There are in operation to-day in the United States about 179,300 miles of steam roads, and about 13,500 miles of street railways. The passenger receipts on the steam roads the past year were \$276,031,000. The gross receipts of street railways in the United States were between \$125,000,000 and \$140,000,000. The street railway mileage is about 7½ per cent of the steam railway mileage, and passenger receipts of street railways about 45 per cent of the passenger receipts of steam roads.

"The total capitalization, bonds and stocks of steam roads in the United States is about \$11,000,000,000, and of the street railways about \$1,300,000,000. The latter is about 11 per cent of the former, while the profits of the steam roads were \$322,000,000 and on the street railway about \$43,000,000, the latter being about 13½ per cent of the former. From these figures an idea may be gathered of the magnitude of the business.

"The association having referred to the executive committee the question of the advisability of enlarging the scope of its work, the question will come back for your consideration, with the committee's recommendation.

"There are many questions which call for more extended and complete work. There are new branches of business to be cultivated by the companies, such as the handling of freight and mail; the delivery of small parcels from retail stores through a system of express; the handling of building material to suburban localities; the handling of milk on special cars for the purpose, and the operation of funeral cars from any portion of the system into cemeteries where special facilities are provided.

"The companies will need to lend a mutual aid to each other through the national association for the purpose of defeating hostile legislation in national, state and municipal governments, and to conduct a work all along the line which will tend to implant in the minds of the patrons of the roads the fundamental idea that the public interest demands friendly legislation for transportation companies, since this will tend to enable the companies to furnish the best and most rapid transportation, while harmful legislation will tend to bring about the opposite result.

"The relation of street railroads to steam roads is growing more interesting, and in some localities even perplexing, until the question is now being asked, what will be the solution of the extension of electric lines, which are cutting so rapidly into the business of the steam roads? A partial consideration of this question brings forth the inquiry—will not the interests of these two systems of transportation force an amalgamation of the systems, having thereby the main lines connecting distant points, which will be operated into stations at convenient points in municipalities from which passengers will be transported over various street railway lines to their destination?

"The steam roads of this country are organized, the territory being subdivided into several sections for the purpose of promoting harmony and mutual protection. While it is true that street railways do not now come into competition with each other, except to a limited extent, yet it is a question if their interests do not demand an organization with sufficient strength and facilities to keep a constant watch over the business throughout the country. It is believed that the time has come when a larger revenue must be raised either upon the assessment plan or by increasing the membership dues.

"The great and important question before you here is the one to enlarge the scope of the association. The executive committee has held three long sessions, two in this city and one in New York, the time being devoted chiefly to a consideration of this question. Seven days and nights have been spent in these meetings, the results of which will appear in the committee's report, and to which your attention is invited.

"I take this occasion to thank the members of the association especially those of the executive committee for the support and co-operation extended to the officers of the association." (Applause.)

On motion, the minutes of the last meeting were approved, as printed.

The report of the executive committee was next in order; but the committee not being quite ready to report, it was laid over until Wednesday.

The report of the treasurer was read and showed the following result:

Receipts	\$7,554.57
Expenses	7,240.55
Balance on hand	314.02

Recess was then taken until 2 o'clock.

The afternoon session opened with the reading of the following paper.

The Present Status of the Air Brake.

BY E. J. WESSELS.

Last October the speaker had the honor to lay before the members of the American Street Railway Association in Atlanta a paper on the subject of Power-Brakes vs. Hand Brakes. In that paper reference was made to the advantages of a good air-brake and the desirability of its adoption on roads with congested traffic, high speed or severe grades, and especially where trailers were used.

At that time the street railway air-brake was in swaddling clothes. Some, not positively indifferent on the subject, proved hostile. When asked their objection to its adoption they generally answered "the air-brake cost too much." Some of the members asserted that hand-brakes answered their purpose and they saw no need for substituting air-brakes. The speaker claimed that every car should have both air and hand-brakes.

To contend against this opposition has not been easy. It takes a long time to convince some men that first cost may not mean much and often in reality proves but a forerunner of excessive outlay. Per contra, sometimes things said at the start to "cost too much" are cheapest in the last analysis. Prices must be judged by relative values and mean nothing unless one sees the apparatus.

In considering the present status of the air-brake it is pleasing to notice that the indifference which existed even in influential quarters has largely disappeared. Months ago a prominent railway president asserted that he would not put an air-brake on his road because, if he did, there would be nothing for his motormen to do. Since then he changed his mind and recently contracted to have every car on his road equipped with air-brakes.

It was asserted in the speaker's Atlanta paper, and may be proper to repeat here, that the object of the present paper is not to advertise any special make of air-brake, but to call attention to air-brakes in general, applicable to passenger and freight electric and cable cars.

Most managers now concede that the old form of hand-brake will no longer answer for heavy, double-truck, high speed cars. There has been a remarkable change of views since we last met. It is now admitted that more reliable braking apparatus must be secured. In fact in several quarters even the question of expense cannot be said to be the chief one. Some go so far as to say "we must have better brakes at any price."

There are instances on record where certain roads have contracted for more reliable braking apparatus at a cost which a year ago they regarded prohibitory. In their extremity these roads naturally turned to those manufacturers who have made air-brakes a study.

It is manifestly unadvisable for a street railway company to turn out its own brakes. The question is such a difficult one, the outlay for experiments is necessarily so

immense, that no individual road is justified in undertaking the business. Some roads build their own rolling stock, but it is easier to build cars than air-brakes.

An air-brake which has merely been tested in the shops is of doubtful utility. It cannot be depended upon for the rough usage it will encounter in service. No air-brake is fit to be mounted on a car, which has not gone through the most crucial tests based on records of similar brakes operated on cars for many months.

To design an air-brake which shall be mechanical, durable and economical is one of the most difficult problems a manufacturer can face. It is comparatively easy to design apparatus which will work admirably if left undisturbed in the shops; but that same apparatus, when transferred under a car, in a short time may be battered beyond recognition.

The street car air-brake has much to contend with:

Firstly. The unfamiliarity of the average motorman with the proper use of air, is greatly against it.

Secondly. The compressor is begrudged space on the car axle, although generous space is freely given to electric motors irrespective of dimensions. This makes it difficult to have proper bearing surfaces.

Thirdly. The neglect of proper inspection is greatly against the air-brake. Even motors do not receive the attention they should, as many a scrap heap testifies. The air-brake hardly receives any.

Fourthly. Insufficient lubrication. The same man who lubricates his motors, passes by the air-brake without using his oil can. Probably he might neglect to oil the motor, but he knows that failure to do so would be speedily detected and render him liable to discipline. The air-brake has not reached that point in street railway operation, where neglect to lubricate it produces like results. The most perfect apparatus ever designed, if neglected, cannot do its work properly, and no automatic oiling machinery or mechanism under a car can possibly replace human vigilance.

A year ago the air-brake was not found on many roads. On the few roads where it was being used, satisfactory results were obtained, and in the Street Railway Journal for March last, in the article entitled "The Street Railway System of Buffalo, N. Y.," a report of the successful operation of air-brakes there will be found. It showed that by using air-brakes there had been a great saving in wheels. As a matter of fact, there should not be any flat wheels if air-brakes are properly used, for by their aid pressure can be regulated to nicety.

Any good brake is better than a poor one, and we welcome into the family our friends who since last convention have put on the market several excellent types of mechanical brakes.

As, however, in street railway practice we are closely following (if not really leaving behind) steam practice, it is reasonable to conclude that if mechanical brakes were the solution of the braking problem, they would be found on steam roads instead of the well-known Westinghouse air-brake. An examination of the patent office records discloses the fact that scores of patents have been

granted for mechanical brakes for steam cars, but one would have to travel far to find a solitary mechanical brake in service on steam roads. If they have proved unfitted for steam practice, and the air-brake has been adopted, it is fair to assume that mechanical brakes may not be all that is required for braking electric and cable cars. It is always better to replace human muscle by some controllable, potent force, and compressed air, under proper conditions, seems to be that ideal force.

The speaker recently returned from an extended trip through Europe.

He rode on hundreds of cars in different places, from the North of England to Budapest, but did not find a brake on any steam road operated by anything but air, vacuum or steam. Investigation proved that air-brakes were much preferred to all other forms. Some trains used the automatic, some the non-automatic. He also found that inspection on most lines was ideal. Not only were the brakes tested, as we test them here, but on many of the trucks diagrams were painted with the words "To be lubricated every so many days." It was the duty of the car tender to chalk in the squares painted underneath, the days when apparatus received attention.

The street car air-brake has been adopted by the Australian government; it has been specified by borough engineers in Great Britain; it is being installed in different places on the continent. It is, therefore, somewhat discouraging to find that while the street car air-brake receives very careful attention abroad, it is denied that attention here. It is unfortunate that our managers entrust it to uninstructed men who have had no experience in its use. No one anywhere would be permitted to handle the Westinghouse triple valve who had not served his apprenticeship of from three years upward, and firemen are not allowed to touch it. The locomotive runner alone is entrusted with it and held strictly accountable for its misuse. More than one runner has been discharged for bad use of his pressure.

The street railway air-brake is entrusted to green men who sometimes don't know enough to use their electrical apparatus properly.

The air-brake for steam roads has undergone an evolution beginning in 1869. Even its most ardent supporters will not claim that the system as applied to-day is absolutely perfect; but it is commercial; and unquestionably has saved hundreds of lives in the past twenty-seven years.

If it has taken that long to bring the present steam car air-brake to a measurable degree of perfection, what may we not hope to see accomplished by the street railway air-brake in a very much shorter time?

There is a book which has reached a third edition entitled "Diseases of the Air-Brake System. Causes, Symptoms and Cure", devoted exclusively to steam road air-brakes. This too after 27 years' experience. Should we expect perfection in the more youthful street railway air-brake which has only been in existence for some three years?

The duties required of a street railway air-brake are more severe than those demanded of a steam car air-brake. The steam train makes very few stops. The stations are well-known and the roads are provided with proper gate crossings and the block system. In numerous places, grade crossings have been or are being abolished. Even the engineers of the Empire State Express do not face the risks to which the motorman of a fast, suburban electric train is constantly exposed. The electric train very often stops where there are no stations, where passengers stand between the rails frantically waving so they will not be left. There being no definite time when the train passes crossroads, the motorman of the electric train is menaced by farm wagons and other vehicles, deaf people, bicycle riders and others, who would not attempt to cross the track if the Empire State or other express was due.

It is placing a motorman at fearful disadvantage to entrust him with a twenty-five-mile-an-hour (and more) train, as is now being done, and failing to provide him with the necessary means for emergency stops!

The air-brake is the only brake which has an emergency stop that can be instantly applied by the easy turning of a handle. Other brakes require muscular effort and generally a number of turns before the braking power becomes effectual. In order to have even an approach to an emergency stop, it is generally necessary with handbrakes to gear them to a point which they would never reach, were the semblance of such stop not required. This excessive gearing means rapid wearing out of parts and needless tiring of muscles.

It is not claimed that the street railway air-brake has reached perfection. It is believed it never will reach that point unless through the co-operation of the railway managers. But even though it is not claimed that the present street railway air-brake is all it should be, we must admit it has made remarkable strides, that satisfactory results have been produced, and that it is commercial. It will not be possible to overcome all the objections to an air-brake unless managers rally around the men who are striving to reach perfection. It is only by braking cars in actual service that important knowledge of the air-brake can be gained. There were air-brakes which entered the lists at the last convention, which have retired from the field, but some are still bearing the heat and burden of the day. It is a case of the survival of the fittest; but even if an absolutely perfect air-brake was in existence, it would stand in jeopardy every hour, so long as an uninstructed motorman is permitted to handle the controller.

Those of us in the midst of the conflict do not despair of being able to turn out an ideal air-brake which will operate satisfactorily under all conditions. If that brake could be delivered to-day and would pass muster before a jury of microscopists, there would still be the factor of neglect and inattention of motormen to contend with.

We may not in this stage of the art expect that leading roads will maintain schools of instruction, nor can the manufacturers of air-brakes, from the low selling

price, support such institutions; but surely it is reasonable for them to expect that motormen should undergo preliminary instructions, and that the simple operating directions shall be faithfully adhered to.

When a man applies for admission to the police force he must undergo a severe examination. One of the questions recently asked was "If there were 4,796 persons in a district and there is one Swede to every three Germans and five Irish, how many Swedes, Germans and Irish are there in that district? If this sort of an examination is required of policemen, should not suitable tests be applied to motormen?"

The speaker recently read a letter from which the following is quoted as giving evidence of what the air-brake has to contend with in some places: "This is by all odds the dirtiest city in the world. Our men are of the lowest degree of human intelligences, utterly incapable of understanding or taking care of any kind of machinery. We are unable at times to keep our cars on the road for lack of motormen. Another difficulty is the possibility of braking the car with current on. Our men are also incapable of appreciating that a little is frequently enough and almost invariably bring the car to a full stop when they only wish to slow down."

Fortunately in the United States such a deplorable lack of intelligence does not exist. Our motormen are far more intelligent, and the recent prolonged financial depression has enabled managers to secure better men than were formerly obtainable. It is gratifying to find that many motormen are anxious to improve their condition and to become more useful to their employers. Many of them send in requests for literature so they may have a more intelligent idea of the apparatus entrusted to them. While this is true of many, we cannot overlook the fact that there are others not so desirable, men who have little ambition and who expect to remain motormen as long as they are able to turn a handle. These claim they render a fair equivalent in work for the wages paid. They forget that the way to secure higher wages is first to show greater proficiency. They remind one of the brakeman who was complained of by passengers for not announcing stations distinctly. His defense was that he could not be expected to sing tenor for \$30 a month.

The cry about trolley slaughter has subsided. Six months ago it had reached large proportions, but the riding public is beginning to realize that even if managers are anxious to minimize accidents they cannot reach the safety point unless a superior class of apparatus is within their reach.

Since we last met, fenders have been made compulsory in several cities. Those who believe most in fenders will not deny that a reliable brake is an absolute necessity. It may be advisable to have both. That is for you to determine. It is probable that air-brakes would have been made compulsory on street railways long ago, had the manufacturers of commercial air-brakes devoted their energies to influencing legislation, instead of concentrating them wholly upon the perfecting of the air-brake. It

is, however, extremely probable that before long the air-brake also will be made compulsory, and this is a good argument in favor of testing it in actual service now, so that if it becomes compulsory, managers will be familiar with its advantages.

The claims of the air-brake over other forms of brakes were fully defined in the Atlanta paper referred to, and need not be repeated. At that time the electric brake was actively opposed to the air-brake. The opposition has since faded away. There has not been, nor is there, an electric trailer brake. If we are to have a reliable electric, motor-car brake, the brake must apply equally well to trailers. Until the advent of an electric trailer brake, the air-brake must certainly be regarded its superior for train service, especially as the air-brake dispenses entirely with brakemen and gives the motor-man absolute control of his train.

Not much is being said about cables although cable roads in large cities are handling, and probably will handle, vast traffic. The use of the combined air grip and brake device on the market means a decided prolongation of the lives of cables with far better brake control than is possible with the levers usually employed.

The street railway air-brake is in a transition state and is going through some of the processes that characterized electric motors. We would not have the superb motors in service to-day, had not manufacturers been able to learn the defects of the pioneer motors through the reports and suggestions of their railway friends.

Fenders, car heaters, lighting systems, and other things are now going through these same processes. Hence, it is not singular that the air-brake shares the common lot.

The questions to be considered are :

Firstly. Are better brakes than hand-brakes necessary?

Secondly. Will not the demand for better brakes grow even more imperative day by day?

Thirdly. Will not some form of power brake become compulsory ere long?

Fourthly. How can the valve of any brake (mechanical or otherwise) be judged except by tests in everyday service?

Fifthly. How can anything (brake or otherwise) undergo a fair test unless the men who use it are compelled to observe ordinary diligence?

Sixthly. How can any movable machinery or apparatus be expected to work satisfactorily unless the moving parts are kept properly lubricated?

Lastly. Can you afford to operate without having a reliable braking system for checking speed or making service and emergency stops?

If you desire to test an air-brake it will not be difficult for you to secure one, and, if perchance, it fails to do all you expect of it, it will be an unwise manufacturer who will not avail himself of any suggestions you may make in the light of your own experience. Let us not forget that your interests and the air-brake manufacturer's are and will always be identical.

On motion of Mr. Connette, of Nashville, the paper was received and ordered to be entered on the minutes.

Discussion on Air-Brakes.

Mr. Scullin, of St. Louis : " We have had some experience with vacuum brakes. About two years ago we tried two brakes, the Eames' vacuum brake, made by the New York Vacuum Brake Company, and another vacuum brake made by a man named Eames, in Atlanta. The main trouble with these brakes was in running through crowded sections. Our speed was so slight and we had to stop so often for wagons, that it was almost impossible for us to keep the pressure strong enough to use the brake. We also found that on account of connecting the vacuum brake to the same rod as the hand brake the hand brake was constantly neglected, and it became almost impossible to use it. In the suburbs we had no trouble in keeping the pressure. Another objection was the fact that we had old motors, and the wire was different. We had cases where the brake failed to work on account of the wires coming in contact with the piping of the brakes, wearing the insulation off of the wires and short circuiting and burning holes through the pipe. Of course that could be easily remedied.

Mr. Wessels : " I would say in response to that question that no air-brake is fit to be in service which has not always available a minimum of 50 stops in reservoir capacity ; so that if there should not be any movement of the compressor, available power for 50 to 100 stops is always present, even if the axle does not turn."

Mr. Wood, of Derby : " Is there any trouble from the exhaust being sufficient to frighten horses? With the brake on the Nantasket Beach line,—the regular Westinghouse brake—there was a sharp exhaust, the same as with a steam road. If there is anything of that kind, in a crowded street, it would be a serious objection, I should think. Is there any very perceptible noise from this brake?"

Mr. Wessels : " As the paper states, it was not written to advocate any particular type of air-brake but without mentioning names, I know of one brake in which the exhaust has been silenced, and there is no hissing or escape that is noticeable ; it has been completely overcome."

Mr. Smith, of Troy : " Where is that brake in use? We are anxious to get a good brake."

Mr. Wessels : " It would be a violation of etiquette to mention where the brake is in use. The paper was not written for that purpose, but I would be glad to tell the gentleman privately where he may find it in use."

Mr. McCulloch, of St. Louis : " I will say that none of the roads I am connected with ever used anything in the shape of an air-brake. Some of our neighbors have been trying experiments with them, and we thought that would be as useful and give us as much information as if we tried them ourselves, and it was hardly considered necessary that we should all try them. One of the roads which runs parallel with one of our lines was so sure about two years ago that they had everything that was

desirable in the way of an efficient air-brake, that they equipped a very large electric car, which was large enough to seat 52 persons, having 13 double cross seats on each side of the car, with an aisle in the middle. They equipped this with air-brakes and ran it for some time. They kindly sent out invitations to all of the street railway people and others in St. Louis, who might be interested in such matters to go with them on an excursion on a suburban road, some 12 or 15 miles out, to see how efficient this air-brake was in its operation. Everybody was very much pleased with it. The motorman with his little finger could stop the car without any effort whatever. The managers of this particular road were so pleased with the operation of this particular brake that they equipped a number of their cars with it and spent considerable money in doing so. By the time they had 10 or 12 cars equipped their repairs began to come in, and they called a halt in the matter. The result was, that no more cars were equipped with air-brakes, and to-day they have not an air-brake in use. They found they could not keep the brakes in such condition that they were always reliable. As I understand it, the trouble arose principally from the fine particles of dust cutting out the packing in such way that there were leaks which could be taken care of only at such expense that it became prohibitory and to-day there is not an air-brake in use in the city of St. Louis, although they had such a splendid start."

Mr. Wessels : " In the paper presented the statement was made that there were air-brakes entered in the list at the last convention, which have since disappeared and the particular type referred to in the paper is the type of which Mr. McCulloch speaks. There were five put in service on the St. Louis & Suburban road, and the management of the road thought so much of the brake, that when the original brakes broke down they rebuilt them again. They realized most emphatically the necessity of having air-brakes. The type of brake which is noiseless, and of which I said I would speak of after the meeting is not the type used by the St. Louis & Suburban road. They never tried the brake in question."

Mr. Seely, of New York : " There is no doubt about there being a field for an air brake on electric railways. Our great steam road systems are not considered up to date unless they are equipped with air brakes. There is no reason why they should not be utilized, especially on suburban roads. The first experiments may not all have been successful, but there is no reason why they should not be perfected. Our first motors were failures, but we got a motor which does fairly well ; and there is no reason why this should not be the case with the air brakes."

The President : " The chair is requested to state that Mr. E. P. Burch, of Minneapolis, who was expected to read a paper on the Feeder System, through a misunderstanding in not having been advised to read the paper, is here but has no paper."

Discussion on Paving.

Mr. Seely : "I would like to inquire of the members of the association their experience regarding street paving. I will state our case specifically—in building a railroad in a certain city the railroad company is compelled to pave its strip eighteen feet in width with the same material that the city officials pave the remaining portion of the street, which happens in this case to be asphalt. In paving this street the paving contractor refused to do the paving unless we entirely suspended our services, taking all cars off.

"They paved one piece, and after that was done, the railroad company decided it would not give up the street. The paving company has refused now to pave that portion of the street, claiming that it could not be done while the cars were in operation, and especially that the concrete would not set, with the cars running over the rail. The railroad company has commenced to put in that concrete itself, keeping the cars moving at the same time, I am pleased to say that it is successful so far—the concrete being laid, headers and stretchers being put in, and cars moving right along. Of course, it is expensive. The next problem is who will pave the top of the concrete with asphaltum. The railroad company is thinking seriously of constructing a plant of its own, and I would like to know if any of the gentlemen present have given up their entire service to the paving company to pave a street."

Mr. Johnson, of Richmond : "In the work under my charge in Philadelphia I have done a great many miles of street paving, but we do it under contract. In that city they require you to pave the whole street, not your strip. If the street is 100 feet wide, you have got to pave it. Our bills amount to a good many hundreds of thousands of dollars. In no case have we given up the street to the contractor. It is a piece of utter contrarieness on the part of any contractor who says that he cannot lay the paving without stopping the cars. We put a concrete paving in and alongside the rail; we did \$600,000 worth of this work. I did the paving in New Orleans, Philadelphia and Richmond. In Richmond we are going to put in a track laid on concrete, and do not propose to stop one minute for anything; it can be done."

Mr. Seely: "Are you connected with the paving company?"

Mr. Johnson: "No, I am a railroad man. I will say, further, that some years ago I was assistant city engineer in Richmond, and had charge of the paving. That was my work, and the contractors did it there for the railroad companies, and the cars never stopped running a minute. There is no reason in the world why they should."

Mr. McCulloch: "We pave between our rails and one foot outside, and between double tracks, with the same material with which the street is paved. We are now on one of our roads engaged in just the work the gentleman has referred to. We have two very busy streets, one of them originally paved with asphalt and the other with granite, both underlaid with concrete, and the men at this minute are working on both streets, and

the asphalt men are paving, the concrete men are paving and the granite men are paving, and our cars are in constant operation, without any hindrance or suggestion of interference; no contractor or paver ever having asked us to discontinue the running of the cars. It would not be tolerated by the Board of City Works in our city. It is not necessary, and is unreasonable on the part of a contractor, and in our city would not be tolerated. It is done with the cars in operation, and there never has been any suggestion of anything to the contrary."

Wednesday Morning.

At 10:45 the convention was called to order, President Hurt in the chair, and at once went into executive session.

The first topic on the programme for discussion, "The Labor Question," was taken up, the discussion being opened by Mr. Wyman, who was followed by Gen. Jackson.

The discussion was suspended to admit of the reading of a communication from Mr. Baumhoff, of St. Louis, inclosing a paper on Transfers. Both letter and paper were read, and on motion the paper was ordered to be spread on the minutes and printed.

The discussion on the subject of Transfers was opened by Mr. Sergeant, who was followed by Messrs. Charlton, McCulloch, Jackson and Hurt.

During the session an announcement was received that several gentlemen connected with the Dublin Tramways Company were without, having come upon the invitation of the president, and on motion the chair was authorized to invite the gentlemen to take seats in the hall and participate in the discussion, if they so desired. They were provided with seats upon the platform.

The discussion of the labor question was then resumed, Messrs. Sergeant, Wyman, McCulloch, McClary, Charlton, Hurt, McLean and Connette taking part.

An adjournment was then taken until 2 p. m.

Wednesday Afternoon.

The convention re-assembled at 2:15.

A letter was read inviting the members to attend the performance at the French Opera Theatre, on Thursday evening. Gen. Jackson moved that the association express its appreciation of the courtesy and that the secretary be instructed to acknowledge the receipt of the invitation with the thanks of this association.

Mr. Hamilton then read the report of the executive committee together with the amended constitution and by-laws proposed by the executive committee.

Report of the Executive Committee.

To the American Street Railway Association:—In discharging the duties imposed in the by-laws of your association, a call was made for a meeting of the Executive Committee, to be held in Montreal on Feb. 27th last. Messrs. Hurt, Bean, Hamilton, Cunningham, together with Secretary Richardson, were present. It was found impossible to obtain the presence of one additional member necessary for a quorum, and it was decided by those present to discuss informally the work laid out by the association at its last annual meeting, with a view to submitting a definite plan to another meeting of the executive committee, to be held as soon thereafter as possible. The sub-committee spent three days in this work.

Shortly after its adjournment, Secretary Richardson was taken ill and on April 26 he died. The committee has thus been denied the great advantage of Mr. Richardson's experience in the association's work, and has been not a little hampered in its efforts to properly handle the detail work connected with the present convention.

A second meeting of the committee was held on May 15th in New York City, and was attended by Messrs. Hurt, Jackson, Hamilton, Payne, Cunningham, Bean, Cunningham and Partridge, Mr. Harrison only being unable to be present. Mr. T. K. Glenn, secretary of the Atlanta Consolidated Street Railway Company, acted as secretary of the meeting, without compensation.

The Committee remained in session for three days, and gave to the affairs of the Association its most earnest and painstaking consideration. Their work was in some respects a repetition of the sub-committee's work at Montreal, partly because of the presence of additional members, and partly because the minutes of the Montreal meeting had been lost through the illness of Secretary Richardson.

The committee found, to its surprise, that the Association was largely in debt, its liabilities exceeding its assets by nearly \$5,000. These liabilities were found to be the accumulation of several years, in which the sum of the actual expenditures and the bills contracted, but not settled, had exceeded the receipts. It did not appear, however, that there was any extravagance in the conduct of the Association's affairs. The receipts have merely been insufficient to take care of all the work laid out by the association at its annual meetings. The chief criticism that the Committee has to make is that the situation had not long before been faced and a course of action determined upon which would prevent the annual increase of debt.

The records and property of the Association contained in the office of the Association in Brooklyn, were examined by the Committee and found to be well kept and in good condition, Mr. Richardson's assistant, Miss Strickland, being in charge.

In view of the plans presently to be referred to for enlarging the scope of the Association, and the Committee being unwilling to forestall the action of the Association at the present Convention, it was determined to appoint a member of the Committee to act as Secretary pro tem of the Association, without compensation, until the annual meeting in October, and Col. John N. Partridge was so appointed. Miss Strickland, who had been for some years Mr. Richardson's assistant, was engaged to act as Col. Partridge's assistant in charge of the Brooklyn office until the annual meeting. Mr. Richardson's salary for the month of May was voted to his widow. Col. Partridge was requested to have the Association's books audited and a report made to the Executive Committee. Col. Partridge was also instructed to resort to urgent methods for the collection of unpaid dues and other sums owing to the Association, and as a result of his efforts a substantial reduction has been made in these accounts receivable.

The Treasurer's report, which is attached to and forms a part of this report, has been made up for the eleven months and fifteen days, from October 15, 1894, to September 30, 1895. It shows in brief the following results:

Balance, Oct. 17, 1894.....	\$ 94.07	
Receipts from all sources during the periods named.....	7,263.25	\$ 7,357.32
Total disbursements during period named.....	7,046.61	
Balance in Bank, Sept. 30, 1895.....	316.71	7,357.32

ASSETS AND LIABILITIES.

ASSETS:

Unpaid dues, \$900, charged to Profit and Loss, by order Executive Committee.....		
Unpaid charges for space, Atlanta Convention, \$114, charged to Profit and Loss, by order Executive Committee.....		
Unpaid subscriptions to Street Railway decisions.....	\$ 10.00	
Volumes Street Railway decisions on hand, appraised valuation.....	200.00	
Office furniture, appraised valuation.....	125.00	
Cash in Bank, Sept. 30.....	385.71	
Deficit.....	4,087.33	\$ 4,808.04

LIABILITIES:

Bills for printing, etc.....	\$3,162.00	
Reports of Special Committees.....	150.00	
Loan, W. J. Richardson.....	300.00	
Expenses Executive Committee.....	77.33	
Office Rent.....	125.00	
Royalties.....	210.00	
Miscellaneous.....	93.66	\$ 4,808.04

It will be seen that among the items included in "Assets" as stated above, appears one entitled "Unpaid Dues," amounting to \$900. The Committee regrets to say that the utmost efforts have so far failed to bring home to the members of the Association who are responsible

for this item, a realization of the fact that their debts to the Association are "debts of honor," which should be discharged with a promptitude certainly as great as would be the case with debts more easily collected by process of law. The Committee recommends that the Association instruct the incoming Executive Committee to make a final effort to secure payment from the following companies, and, if this effort shall not prove successful within sixty days, to drop the names of such companies as shall not have paid, from the list, and their membership shall thereupon cease.

Name of Company	No. Arrears	Amount Due
Sandusky Street Railroad Company.....	5	\$125.00
Hooesac Valley Street Railway Company.....	5	15.00
Central Crosstown Railroad Company.....	4	100.00
Central Railway Company, Peoria, Ill.....	3	75.00
McKeesport and Reynoldton Passenger Railway Company.....	2	50.00
Syracuse Consolidated Street Railway Company.....	2	50.00
Colorado Springs R. T. Railway Company.....	2	50.00
Second Avenue Passenger Railway Company, Pittsburg.....	2	50.00
Paterson General Electric Railway Company.....	2	50.00
Canton-Massillon Electric Railway.....	2	50.00
Metropolitan Railroad Company, Washington.....	1	25.00
Citizens' Electric Railway, Light & Power Co., Mansfield.....	1	25.00
Allentown & Bethlehem Rapid Transit Company.....	1	25.00
Columbia Electric Street Railway, Light & Power Co., S. C.....	1	25.00
Atlanta Traction Company.....	1	25.00
Miami Valley Company, Piqua, O.....	1	25.00
		\$900.00

(During the meeting a telegram was read stating that the Second Avenue Passenger Railway Company had paid the arrears.)

This Committee, in further explanation of the foregoing financial statement, and as a summary, report as follows:

That there has been paid, during the past year, for bills and expenses incurred previous to October, 1894, the sum of.....	\$4,141.69
That there are still outstanding bills for the same period.....	3,521.00

A total of.....	\$7,662.69
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That there has been received from all sources which accrued previous to October, 1894.....	\$2,951.32
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Leaving the net deficit previous to October, 1894.....	\$4,711.37
That during the year last past there has been received on account of the year.....	\$4,475.00
And there has been expended on account of the same period, in cash.....	\$2,898.92
And unpaid bills incurred and rendered up to October 14, 1895.....	1,287.04

A total for 1895 of.....	\$4,185.96
Surplus of 1895 over disbursements and bills.....	289.04

Deficit of previous years.....	\$4,711.37
Surplus of 1895.....	289.04

Total deficit.....	\$4,422.33
Assets on hand—books, furniture, etc.....	335.33

Net deficit.....	\$4,087.33
Total liabilities, October 14, 1895.....	\$4,804.04
Cash in bank, October 14, 1895.....	385.71

Deficit.....	\$4,422.33
Assets deemed good.....	335.00

Deficit.....	\$4,087.33
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At the last annual meeting your Executive Committee was instructed to take into consideration the advisability of recommending a plan for the enlargement of the scope of the Association. After much consideration of the subject the following resolution was passed by the committee:

"Whereas, At the last annual meeting of the Association the following resolution was passed:

"Resolved, That the Executive Committee is hereby requested to take under consideration the question of the enlargement of the field and scope of the Association, and submit a plan, suggesting ways and means therefor at the next meeting of the Association.

"Resolved, That it is the sense of this Committee that the scope of the Association be so extended that a bureau of information be created for the purpose of collecting and disbursing statistical and general information as to the management and operation of railway properties, insurance, legislation, and investigation of legality and value of patents, and such other matters as may from time to time be referred to it by the Association or its Executive Committee."

In order to carry out the provisions of this resolution, a sub-committee was appointed at the New York meeting, to draft certain amendments to the Constitution and By-Laws of the Association. This committee presented its report at a meeting of the Executive Committee held in Montreal yesterday, Oct. 14th, and practically the entire time of the committee was given up during the day and evening to a most careful consideration of every suggested change. The results of the committee's deliberations are found in the accompanying revised Constitution and By-laws which are submitted to the Association as embodying the best thought which the committee has been enabled to give to problems which directly affect the Association's welfare.

On the question of admitting Associate Members and the method of raising dues, Mr. Harrison, of the Committee, voted nay.

In making these changes the Committee has endeavored first to vastly increase the useful work of the Association for the benefit of its members, and second to provide the necessary funds for the accomplishment of this work in such a way as to place the burdens justly and in a manner such that they can be borne easily and without the slightest difficulty by large and small companies alike. Radical action has been avoided, together with a too sudden increase of responsibility on the part of those charged with the undertaking of the new work, it being the Committee's belief that the Association should proceed carefully and step by step towards the far larger field of usefulness which lies within its eventual reach.

The Committee recommends to the Association that the present custom of issuing banquet tickets to delegates in attendance be abolished, and that in future a uniform charge of five dollars for each ticket be made to all members and others who desire to attend the banquet.

MEMBERSHIP.

At the opening of the meeting in the city of Atlanta there were 173 member companies.

At the meeting and during the year the following Companies have joined:

Atlanta Traction Company, Atlanta, Georgia.
 East Harrisburg Passenger Railway Company, Harrisburg, Pa.
 Lock Haven Electric Railroad Company, Lock Haven, Pa.
 Montreal Park and Island Railway Company, Montreal, Can.
 Miami Valley Railway Company, Piqua, O.
 Scranton Traction Company, Scranton, Pa.
 Portland Railroad Company, Portland, Me.
 Derby Street Railway Company, Derby, Conn.
 The following companies have withdrawn:
 Helena Rapid Transit Company, Helena, Mont.
 Lincoln Street Railway Company, Lincoln, Neb.
 City Electric Railway Company, Little Rock, Ark.
 Marinette Gas, Electric Light and Street Railway Company, Marinette, Wis.

Union Railway Company, New York.
 Pittsburgh and Birmingham Railway Company, Pittsburgh, Pa.
 Schenley Park and Highlands Railway Company, Pittsburgh, Pa.
 Roanoke Street Railway Company, Roanoke, Va.
 Metropolitan Railroad Company, Washington, D. C.
 Wilmington Street Railway Company, Wilmington, N. C.

As the result of these changes, there are now one hundred and sixty-six members.

Obituaries.

It is with a sincere feeling of sadness and a sense of personal loss that we again speak of the death of one who has been, since the birth of the Association, one of its most prominent members and officers. Mr. William J. Richardson was known to every street railway man in the country as an honorable, high-minded man, and one whose influence has always been exerted in behalf of the highest ideals of business and personal action. Mr. Richardson was born in Albany in 1849. In 1876 he became associated with his father, the late William Richardson, in his railway interests in Brooklyn, and, until recently, has been for many years an official of the Atlantic Avenue Railway Company, of that city. He had been secretary and treasurer of this association and of the Street Railway Association of the State of New York since their organization.

Ex-Governor Oden Bowie, president of the Baltimore City Passenger Railway Company, died at his home on December 4, 1894, of paralysis. Mr. Bowie was 68 years of age at the time of his death. He was a captain in the Mexican War, was elected Governor of

Maryland in 1867, and was elected President of the Baltimore City Passenger Railway Company in 1873.

Thomas M. Sayre, who was for fourteen years superintendent of the Jersey City & Bergen Railroad Company, died on July 28, 1895, of typhoid-pneumonia. He has been connected with the company named for thirty-one years.

The above is respectfully submitted.

JOEL HURT,
 J. H. CUNNINGHAM,
 W. H. JACKSON,

W. WORTH BEAN,
 D. G. HAMILTON,
 GRANVILLE C. CUNNINGHAM,
 Executive Committee.

Mr. Seely moved that the report of the executive committee be received and spread on the minutes, and that a vote of thanks be extended to the executive committee and Col. Partridge for the report. The motion was carried.

An adjournment was taken until 4:30 p. m., to enable the members to attend the reception given by McGill University.

On re-assembling at 4:50 p. m. the chair accorded to Mr. Harrison the opportunity of making an explanation, which he desired to make respecting his non-concurrence with the report of the majority of the executive committee, upon some items embraced in their report. This was followed by a discussion in which Messrs. Harrison, Hamilton, Jackson, McCulloch, Thompson, Hurt, Cunningham, Wyman and Fairchild took part. Finally, on motion of Mr. Wyman, it was agreed that the report as read by the executive committee be spread in full on the minutes, that it be printed, and a copy thereof sent to each member of the association and that action thereon be deferred until the next regular meeting of the association.

On motion of H. M. Littell it was voted that the chair appoint a nominating committee of seven, on officers and place of next meeting.

Mr. Harrison moved that a committee of ten be appointed by the chair to devise ways and means for raising the deficit. The motion was carried.

Adjourned until 10 o'clock Thursday morning.

Thursday Morning.

The convention was called to order in executive session by President Hurt at 10:45, a. m.

The chair announced the following committees:

On Ways and Means: R. B. Harrison, H. M. Littell, T. H. McLean, W. Y. Soper, H. M. Watson, Charles Odell, Charles Green, E. C. Goodrich, T. C. Penington and John N. Akerman.

On Nominations: C. D. Wyman, Milwaukee; Charles S. Sergeant, Boston; John B. McClary, Birmingham; W. J. Thompson, Camden; Edward Lusher, Montreal; John A. Seely, New York; Henry Scullin, St. Louis.

Mr. Wyman requested that some other member be named as chairman of the committee, as he would be obliged to leave Montreal very shortly.

The president replied that that was a matter which could be arranged by Mr. Wyman with the other members of the committee.

Mr. Wyman requested that all invitations for the holding of the next convention be handed to the committee.

The secretary read a letter inviting the delegates of the association to hold the next meeting at Saratoga Springs, N. Y.

Mr. McCulloch, of St. Louis, "Mr. President and Gentlemen: We offer the association the hospitalities of St. Louis for the next convention. Ten years ago you were there, and we entertained you under such disadvantageous circumstances that we feel we would like to do it over again and do it properly. We were in the midst of the only strike we ever had, and at the time you were there, not a car was running in the city. We have a good many running now, and while we do not wish to boast we will say that we are not behind the times in anything, and when you come there you will find everything with us as modern and as varied as you will find it anywhere else. We have both cable and electric cars, and we have them in as good shape and condition as we know how to put them. We will try to entertain you as hospitably as we did ten years ago, and I believe you were all satisfied with everything except the operations of our roads at that time."

The secretary then read the following letter from the secretary of the Chicago City Railway:

Mr. Joel Hurt, President American Street Railway Association.

Dear Sir:—I am requested by the several street railway companies of Chicago, to extend a cordial invitation to hold the 15th annual meeting of the association in Chicago.

At the convention in Atlanta, invitations were presented from cities that have entertained the association since it met in Chicago. If the committee will consider cities that have already had the convention, then we think our city has a strong claim, as Chicago had practically the first convention.

Chicago has over 600 miles of street railways, and owing to its central location presents an ideal place for holding the meeting.

In the event of the association coming to Chicago, we suggest that an Exposition of Street Railway appliances be held, similar to the exhibitions held heretofore, only on a much larger scale, and that it be made as large and attractive as possible in order that the general public will patronize it generously. In this way we are confident that the association will realize enough money to pay off its existing debt.

We have assurances from all the leading hotels that only regular rates will be asked.

Trusting that this invitation will meet with your acceptance, I assure you that we will entertain you in true "Chicago style," and promise to make the exposition the leading feature of the convention, as well as a monument of success.

Yours truly,

FRANK R. GREENE, Secretary.

Mr. Bean spoke in favor of accepting the invitation to meet in Chicago.

A letter was next read from the chairman of the committee of the National Electric Light Association, on "Standard Rules for Electrical Construction and Operation;" also the resolutions on the proposed rules, adopted by that association last September.

William J. Hammer, by permission of the convention, spoke briefly in support of the request made in his letter for the co-operation of the American Street Railway Association with the National Electric Light Association in securing the adoption of one standard code of rules for electric construction and operation, and for the appointment of a representative from the Street Railway Association to serve upon the proposed joint committee.

On motion of E. H. Davis, of Williamsport, it was agreed that the incoming executive committee be authorized to appoint a delegate on behalf of the American Street Railway Association.

The chair stated that the next matter in order was the discussion of municipal ordinances. The gentlemen who were requested to open the discussion on this question were not present and no discussion was offered.

Mr. Harrison read off the names of the members of the ways and means committee and requested that a meeting of that committee be held immediately. The members of that committee who were present then left the hall with Mr. Harrison, to hold a meeting.

On motion of Mr. Davis, the executive session was declared over and the regular business resumed, first on the program being the paper on "Ties and Poles" by N. W. L. Brown, of Atlanta. The full text of the report will be found on another page of this issue.

The paper was accepted and made a part of the minutes. Then followed the report of the committee on patents, consisting of Frank R. Greene, Chicago; and J. W. McNamara, of Albany.

Report of the Committee on Patents.

Among the many perplexing problems that have demanded the attention of some of our western street railways is the question of "worthless patents," and it being evident to several gentlemen of the street railway fraternity that an association to handle all matters pertaining to patents, as affecting street railways, would be highly beneficial to all concerned, a committee was appointed at Atlanta to take up the matter and submit a plan of organization.

This committee working upon the lines suggested, has investigated the matter, as far as it has been within their power, looking up facts and matters pertaining thereto, and desire to submit to you the following report for your careful consideration:

The majority of street railways have, at one time or another in their history, been sued for using or making some device, which was an alleged infringement on some patent. These cases were either fought out in the courts, or settled by the railroad company, rather than go to the expense of court costs and attorneys' fees. A large proportion of railways have paid and are now paying royalties, either directly to the patentee, or indirectly to the manufacturer (the royalty in the latter case being included in the price of the article paid by the purchaser) on certain articles in use on their systems. These direct royalties are often paid when exacted, to avoid going to the expense of hiring an attorney to look up the patent papers to see if the claimant has a good patent, and a valid claim to his royalty. The writer knows this to be the case with the company with which he is connected. The expense of investigating such matters is often more than the amount involved, hence the matter is settled upon the payment of a few hundred dollars. The manufacturer should stand the burden of infringement suits, and not the purchaser, and the advantage of an associa-

tion of this kind would be to influence or compel the claimant to direct his suits against the manufacturer and not the railways. Since the adoption of electricity as a motive power, we find that the number of patented articles in use on street railways has increased wonderfully. We are confident that a large number of these patents are worthless and will not "hold water."

Were these alleged patents to be investigated, a great number would become common property, on account of the patent feature becoming eliminated and hence the patentee would be deprived of his royalty, and the manufacturer would at once reduce his price in consequence. We do not mean to say that the honest inventor is not entitled to his royalty, provided he has a good bona fide invention. It is clearly evident that if the street railway companies were combined together in an association of this character, that the expense to each would be small, while the advantages will be manifold. Another important item will be the assistance of the association in advising its members concerning new inventions of their own employes, whether said articles are patentable, or whether infringements on other inventions; said assistance to be furnished free to said railway companies which are members of the association. This will serve to encourage employes to work out improvement in devices in use on street railways and protect them in their rights. The advantage to the company presenting such new invention will be that it will be permitted to use said device free of royalty.

A great many devices in use on our system are common property at the present time from the fact that the patent has expired, yet how many members of this association know the expiration of the patent limit on a single device in use on their road, and in ignorance of such facts are still paying the same old price.

The idea of such an organization of this kind was prompted by the fact that two similar ones have been in existence for over 24 years for the benefit of the steam railroads, and have been highly successful in every detail. One of these associations is located in the east, and the other is located at Chicago, and the two include as members all the important railroads in the country and a large number of the smaller roads.

The object of the Western Railroad Association, as stated in its by-laws (from which I quote) is as follows:—"The object of this association is the investigation of all patents and improvements effecting the interests of all railroad companies, members hereof, and their mutual protection against the unjust and unreasonable claims and demands of patentees and their representatives, and the procuring of other information which may appear to be of value to the association."

We have had several conferences with the general counsel of this association, and he has been very kind in giving us information regarding the workings of his association. He also declared that an association of like nature for street railways will be highly beneficial to all concerned, and recommended it. I have with me a copy of their constitution and by-laws, also a copy of their an-

nual report for the year 1894, which is worthy of inspection and a valuable guide to the street railway interests.

This association is maintained by an annual assessment of its members based on the gross earnings of the several railroads, payable in quarterly installments. The expenses of the association consist of the salary of an attorney, office help, rent, traveling expenses, court expenses, patent office books, pamphlets, etc., and is conducted on a more expensive scale than would be necessary in a like organization for street railways. For instance, in the beginning our association might not feel like hiring an attorney to give his entire time, but only pay him for actual work, on fixed rates. The expenses for the first year would, of course, be larger in proportion than the following.

The Western Railroad Association has won about four-fifths of its suits, and stands all expenses connected with said suits, but does not, of course, pay any judgments; the defendant road paying any judgment that may be entered against the road. The entire membership, however, obtains the benefit of all such trials. The work performed by the Western Railroad Association in 1894, if done through the regular channels by the roads themselves, would have to cost about ten times as much as was paid to the association during the year for same. It is the practice of the roads belonging to the association not to put on any new device without first referring same to the association for advice. The number of suits against the railroads have been reduced very materially since this association was started, and \$60,000,000, in judgments were defeated in one year. One of the large trunk lines paid \$10,000 for using a patented article that was afterwards found to be worthless as far as the patent feature was concerned. Since then the company refers all such matters to the Western Railroad Association before adopting devices or settling claims of this character.

A certain street railway, so we are informed, paid \$1,500 to prevent suit on an alleged infringement, and the patent was worthless as was afterwards learned. This might have been saved if an organization of this kind was in existence.

One of the roads represented at this convention is negotiating at the present time with two different firms on matters that could properly be referred to an association of this character. One of the articles in question is used by all electric railways in large quantities and the inventor is receiving large royalties from the manufacturer. A patent attorney informed the road that he thought the patent worthless, but it would take a law suit to convince the manufacturer. If this be true, this road would have saved \$10,000 to \$15,000 by having this matter investigated at the start, saying nothing about what others would have saved who are using this article to-day and are paying the manufacturer whatever he chooses to ask.

The other device referred to can be manufactured by the companies themselves, which is also true of the former article and has recently come into use and is being used by several companies in large quantities. The

patentee is willing that the street car companies manufacture said devices themselves, providing they will pay him a large sum of money for the privilege of so doing—the company already having paid him many thousands of dollars for furnishing said article up this time. We understand that a similar device has been used by another manufacturer in the past, though for some reason it was not patented. This being true, the patent is worthless and his demand for royalty would fall flat were the same taken to the courts for settlement. These two matters are still unsettled and are very important to the roads in question, as well as to others who are members of this association and are using the same device.

5. Decrease in the number of suits and claims on account of the existence of such an association.

6. Advantage in settling suits.

7. Contesting and avoiding unfair and unjust royalties.

8. Reduction of prices on all patented articles.

9. By members refusing to buy articles where suits are brought against any of its members, thus shifting suits to the manufacturer.

10. The dissemination of valuable information to its members of all matters relative to any suit, etc., in which one or more members are the interested parties.

11. Advantage of employes of street railway companies in getting valuable information and assistance on their own inventions, whether patentable or infringement of other devices, without additional cost to said railway or employe.

Another road, a few years ago, paid over \$1,000 in royalty on a truck that was invented by a former employe, while working for the road, simply to prevent a law suit, as it would cost more than this amount to have defended the suit. Other cases could be mentioned, but I will not take up your valuable time.

Another important feature in this connection would be the collecting of different patented devices in use on our systems, the same to be preserved and open to the inspection at all times of the members of the association. In short, we might sum up the most important points, as follows:

1. Lessening total expenses in fighting patent suits, etc., as a suit affecting one road would affect all.

2. Uniformity of action.

3. Additional safety in putting on new devices.

4. Greater facility in defending suits, etc.

12. The acquiring of a full and authentic report of all devices that are commonly found in use on all street railways, such as fare registers, brakes, rail bonds, and numerous other articles, giving the expiration of all such patents, opinion on the validity of the same, etc., and to be followed up by like reports from time to time, giving list and opinion of new patents, and list of expired patents.

13. The acquiring of models, devices, etc., for permanent exhibition.

In conclusion your committee desires to express two plans of carrying into effect the above scheme, and recommends that the association adopt one of the following methods:

1. Provided the members vote to increase the scope of the association, we recommend that a bureau be established to handle all matters pertaining to patents as outlined in this report.

2. Provided it is not deemed best to enlarge the scope of the association at this time, we recommend that the association pass a resolution providing: That the annual dues be divided into two classes, regular and special (or, if necessary, the by-laws be amended to that effect). That all members be required to pay the regular dues as already provided in the by-laws, and that it be optional with members to pay the additional or special dues. That members paying special dues will be entitled to all the benefits to be derived through the agency of a patent bureau to be established under the direct control of the American Street Railway Association. That the special dues be based upon the gross earnings of the several roads. That the association elect a board of control, consisting of three members, whose terms shall expire in one, two, and three years respectively, and hereafter electing one member each year. Said board of control to establish and carry on a patent bureau as outlined in this paper, with the funds paid into the American Street Railway Association as "special dues." Provided further that no street railway companies be entitled to the benefits and privileges of said patent bureau except they are regular members of the American Street Railway Association.

The report was received and referred to the incoming executive committee.

Mr. Seely offered the following resolution:

Whereas. It is the purpose of the National Electric Light Association to hold in New York City next spring at its annual convention, a comprehensive exhibit of modern electrical inventions and applications depending on the use of central station and power house current, with the object of increasing popular interest in electric lighting and allied arts and,

Whereas, It is the desire of the American Street Railway Association to promote on the part of the public, particularly in all large cities, a fuller and more intelligent appreciation of the great benefits that accrue from electric light, heat, locomotion and other modern triumphs of civilization,

Resolved: That this association hereby expresses its cordial sympathy with an approval of this plan for the furtherance of electrical development and for the enlargement of the sphere within which electricity is to perform its beneficent work.

Mr. Davis, Williamsport: "I desire to say a few words in regard to the resolution just read. The National Electric Light Association intends to hold an exhibition in connection with its next annual meeting, to be held in New York City, in May or June of next year. The exhibition will be held under the auspices of the National Electric Light Association, but is to be given in the name of a company formed specially for that purpose with a sufficient capital to make the exhibit of far more than ordinary interest. I understand that the object is to include in that exposition electrical appliances applicable

to street railways as well as appliances applicable to the electric lighting business. The resolution is simply intended to interest the members of this association in the exhibition.

The resolution was adopted.

The meeting then adjourned until 2 o'clock.

Thursday Afternoon.

Vice-President Cunningham called the meeting to order at 2:20 p. m.

The report of the committee on ways and means was presented by the chairman, Mr. Harrison:

Report of the Committee on Ways and Means.

Pursuant to the appointment by the president of the association, Joel Hurt, the following members of the ways and means committee met this day in room No. 1, Windsor Hotel, at 11:30 a. m. Present: Russell B. Harrison, Charles Green, T. C. Penington, H. M. Watson, John N. Akarman, H. M. Littell, Charles Odell, E. S. Goodrich, Thomas H. MacLean and W. Y. Soper.

Your committee recommend that the several members of the association be requested to contribute a sum not less than \$15 each, to liquidate the floating indebtedness of the association, amounting, as stated in the report of the executive committee to the sum of \$4,087. Your committee believes that the amount thus realized, together with the net revenue to be derived from the rental of space in the exhibition hall, will be sufficient to pay all present indebtedness.

And your committee in order to prevent any recurrence of any deficit, further recommend that the practice heretofore established of giving to the members of the association banquet tickets, be discontinued, and that hereafter a uniform charge of \$5 be made for such tickets.

Your committee recommend the adoption by the association of the proposed amendments to article 3 of the constitution, and article 7 of the by-laws, introduced at the Atlanta meeting of the association, which proposed amendments received the unanimous approval of the executive committee and the association itself at the Atlanta meeting, as appears by reference to pages 119, 120 and 121 of the report of the Thirteenth Annual Meeting, which proposed amendments are as follows:

CONSTITUTION.

MEMBERS.

Article 3 of the constitution shall be amended so as to read as follows.

Section 1. There shall be two classes of members—active and associate.

Section 2. Active members shall be American Street Railway companies, or lessees, or individual owners of street railways, and each member shall be entitled to one vote by a delegate presenting credentials.

Section 3. Associate members shall be individuals or firms, or companies, not embraced in Section 2, who have been recommended by an active member. Associate members shall not be entitled to vote.

BY-LAWS.

MEETINGS.

Article 2 shall be amended by the substitution of the word "Tuesday" for "Wednesday," and by the addition of the following words to the first sentence, namely, "and shall continue four days."

Respectfully submitted,

RUSSELL B. HARRISON,
JOHN N. AKARMAN,
E. S. GOODRICH,
T. C. PENINGTON,

H. M. LITTELL,
H. M. WATSON.
THOMAS H. MACLEAN, Secretary,
CHARLES GREEN.

Discussion on Admitting Supply Men.

Mr. Harrison stated that voluntary subscriptions had been canvassed, and in the space of an hour and a half nearly two thousand dollars had been subscribed.

Mr. Hamilton: I feel that this committee is deserving of the thanks of this association, and I would move that this report be received and entered on the minutes.

Mr. Thompson, of Camden: There is one thing predicated on the matter which I do not like. Am I correctly informed that the payment of this money is predicated upon a certain state of facts reported; in other words, if you do not adopt the resolution, the money does not come?

Mr. Hamilton, of St. Louis: I would like to draw attention to an error in it. This report is based upon the assumption that the deficit is \$4,087. As stated when the report of the executive committee was read, the four thousand dollars is for past indebtedness, and does not include any of the bills for the banquet and other expenses here. This report assumes to take the profit realized on the exhibition for the past indebtedness. We have in the neighborhood of two thousand dollars of expense here, in addition to the other, which will make it amount to over six thousand dollars. You are starting out, assuming that you are going to relieve the incoming executive committee by raising that amount of money, and using part of the assets which the present committee must have in order to apply it on indebtedness incurred. I want the members to understand how it is.

Mr. Harrison, of Terre Haute: The committee believes that from the way we have received such liberal responses up to the present time, we will raise a larger sum than four thousand dollars. They also believe that by the adoption of the report, providing for associate members, that it will bring to the association for the coming year from \$7,500 to \$10,000 over and above the annual dues that become due and payable on the adjournment of this convention, which will be from 175 companies, or in the neighborhood of \$3,500, giving the association more funds than it has ever had before in its history, and put it on a substantial basis, financially.

Mr. Thompson: Now we can discuss this matter intelligently. It is a question if you street railway men who are putting up your money and investing it in street railways are going to permit outsiders to come in and put up their money and run your association. That is the size of it. I think the street railway companies that are represented here are able to discharge the debt. All that need be done is to say, "We will charge you in proportion to your income," and let them levy it right here, without having a subscription. Admitting the voluntary subscription to be all right, to predicate it upon the adoption of something else, to my mind—and I say it very plainly—is the worst thing you can do. We have the greatest amount of respect for the material men, but we do not want them as members of this association. That is the plain Anglo-Saxon of it. If this is to be an

association maintained by American street railway companies let them maintain their organization and pay the reasonable and legitimate expenses for the diffusion of knowledge that will be a benefit to the parties concerned. If the parties who sell material want to come here and show their exhibits, and call attention of the delegates to the proper running of the road and the proper parties to buy of, who has the best equipment at the most reasonable price, that is the proper thing. But if you permit these gentlemen to come in here and talk, they will certainly have a great influence upon the voting power; and with small roads, having an equal voice in the association, they might exert considerable influence in shaping the votes of the members. The report of the committee shows certain subscriptions; if there are not enough there, ask the railroad companies to contribute so much more, but do not predicate it upon the adoption of these resolutions. While my road is a small one, we are willing to pay an extra hundred dollars, and I will say now put that down on the subscription list, but not in the way in which it is done.

Mr. Harrison: I stated clearly as chairman of the committee that some of the contributions were received with conditions and some were not. As to the gentleman who has just spoken, he made his without any conditions, but there are others who made conditions, among them the president of the association. We proceeded to receive voluntary subscriptions approximating \$2,000, and intended to continue our work and before the convention adjourned secure the full amount, \$4,000, and probably more. We are not recommending the adoption of any by-laws that have not been thoroughly discussed by the members of the association. Everyone has received a report of the last meeting, and in that report it is stated definitely that the by-laws recommended received the approval of the executive committee at the Atlanta convention, and also received the unanimous vote of the members. We do not propose that the supply men shall run this association. We have denied them the right to vote. The report, we believe, should be adopted by this meeting, because it brings to you relief that you require. We cannot exist without the supply men and they cannot exist without us, and why erect a barrier between us, and say that they cannot come to our meetings, when we are taking a thousand dollars from them for the space in the exhibition hall. Is it right or fair? No one can say that he is taken by surprise by this matter, as it has been before us for years and was voted on at the last meeting.

The motion of Mr. Hamilton to receive the report and spread it upon the minutes was put and carried.

Mr. Akarman, of Worcester: A few words as to the fallacy of the argument of the gentleman from Camden. He said that if supply men became associate members of the association we will lose control of the affairs of the association, by reason of their being made active representatives of the association. If my understanding is correct that same thing could apply now. There is no reason why a supply man cannot come here as the accredited representative of a street railway company. I know, as a matter of fact, that there are supply men here in this hall who have a right to vote and to participate in our deliberations, coming here as the representatives of street railway companies. The intention of the committee, as I understand it, being one of its members, was not to make it a condition of the subscription that the supply men should become members of the associa-

tion. I did not subscribe with the idea, but I think it would be no more than fair to admit the supply men. We owe a great deal to them. Its inception was brought about by them. It began at Boston through the efforts of Walter A. Jones, Mr. Brill and one or two other supply men who had been about the country and were well acquainted with the railroad men, and suggested the idea of forming this association. I have always felt that we treated the supply men very shabbily. The committee had in mind, as far as I could see, and in the discussion which was had, that the convention last year had practically passed upon this matter—that it had been canvassed and passed by last year's executive committee and by the association, and was a proper subject to bring up at this time; but if it is not the sense of the association to admit the supply men I will not feel bad about it. I am honest in my belief that the supply men contribute largely to the success of the conventions, and I think they should be admitted to associate with us.

Mr. Harrison: A member of the committee has requested me to make a further explanation. Mr. Thompson did not say so exactly, but drew the inference that we proposed to take in the supply men to pay the debt. The first thing the committee voted upon was a proposition that the street railway men come forward and settle the debt, and leave the entire revenue received from the associate members to go to the work of the association. In other words, we do not ask them to help pay our debt, in any way.

Vice-President Bean in the chair.

Mr. Hurt, of Atlanta: I did not propose to say anything on this report, because from the very generous way that the gentlemen propose to raise the debt, I had no doubt they would do it. I must confess, however, that I am disappointed in the report submitted. It is not what I supposed would be submitted. I have been referred to as one of the subscribers attaching a condition to his subscription. I will state some of the history of this matter. I was approached to know if I would subscribe something. I said, "Yes; on what basis?" "Any sum not less than fifteen dollars," said the chairman of the committee. "Do you hope to raise enough money on that basis?" "Yes." "I do not think you will; let the scheme be sufficient to pay off the debt, and I will join you." In a half hour or so I was invited to the room of the committee and requested to sign a subscription blank presented to me for \$50. The heading recited that the companies below proposed to subscribe the amount set opposite their names for the purpose of liquidating the debt of the association. I have been in enterprises of this sort, proposing to raise so much money and failing. I said if they would leave off the heading, as it read, and make it read that the undersigned would raise sufficient funds to pay the debts of the association, I would sign it. There are 24 names now, each subscribing \$50, and I said let the names stand, that we propose to subscribe enough to settle the debts. But the committee has come here with a partial report, supposing that others will subscribe the amount.

There is a Trojan horse in this report; if it is adopted it will mean the dissolution of the association. I have been attending these meetings regularly, have received a great deal of benefit and want to receive greater benefit. I submit that the gentleman meant every word when he said that the report was presented on the idea that you would adopt these recommendations for the amendment of the by-laws. It is the same proposition that for two days has been before the executive committee, and the reason for the delay

in the report. I will gladly sign a subscription "to pay the debts of the association," if it is put in that way.

Let us have a word about the supply men. I believe I am as good a friend to the supply men, so far as concerns the purchasing of supplies, as any man here. I know a good many of the supply men, and to their credit let me say that I do not know but one man who desires to be a member of the association. They do not want to come in; they know it means the death knell of the association and injury to their business. These supply men are gentlemen and respect their business, and they know that to come in here and interfere with family matters will not be to their advantage.

If we should adopt this amendment, there are probably half the members who would not come here and expose their business to supply men in secret session. If the association means to have any respect for itself and means to be an institution for the good of its members, let us meet this question like men. Do not let us go around pleading poverty and the baby act. Do not let us come here and say we will raise the money and then come back with a proposition to raise \$2,000, upon various conditions, and the balance we are going to ask our brethren all over the country to subscribe in sums over fifteen dollars each. For one, I am here with you and propose to stay with you to fight this matter out and help build up this association and sustain it as long as we can hand in hand, against the common enemy. If I know my enemies I am not going to ask them into my household and give them equal rights with myself. Even though they cannot vote, they can talk; there has been lots of it done since I have been here.

We should study this matter carefully and view not so much the amount of money involved, but look more to the future welfare of the association. The question is whether you are going to have the association preserve its dignity and be of benefit to its members, or whether you intend to have a junketing affair, as it has been somewhat in the past, and which, if it should become any more prominent, will lose you lots of members—quite a number of those here to-day. I have had enough junketing. I am anxious to meet the delegates, to have a banquet, but I do not want to call upon the supply men to pay for the banquet. This committee is in favor of each man paying for his own ticket, and in favor of the supply men paying no more for a ticket than anyone else. If the supply man is our guest, he ought to have the ticket for nothing. I will pay one-twentieth if you will raise the amount of the whole debt, but do not propose to pay one cent unless you raise it all. I do not propose to leave it as an inheritance to the executive committee that you will elect to-day.

The amendment says that "associate members shall be individuals or firms or companies not embraced in section 2." Just see how broad! It will include everyone in this room and any kind of business firm or establishment in the whole world besides. Who ever heard of such a proposition. Let us invite the whole world to join us. The section further says "who have been recommended by an active member." I could bring you fifty applicants inside of a week, recommended by an active member, and not one of them would have any business in this room. Here is the great saving clause (?)—"Associate members shall not be entitled to vote." They will fill this hall three times over, and you can not tell who is voting. You will have no more executive ses-

sions. You will not get men to talk out. See how quickly the change came yesterday. I had not heard what was said in the executive session after meeting yesterday, and requested that the discussion should be printed and sent to each member of the association, confidentially. It was passed, but as soon as the members re-assembled the motion was rescinded. "I do not propose to talk on the floor," said one of our important members, "if you are going to publish it to anybody! you can hear it, but I do not want it published."

Mr. Harrison: "I tried to make my position as a member of the executive committee clear to all. It was that I believed we should take up and act upon the proposed amendments to the constitution. These amendments had the approval of the last executive committee and also the ratification of the Atlanta convention, and I thought they should be disposed of at this meeting. The executive committee simply ignored them. This was my position, and I have endeavored to make it clear. I am under no obligations to the supply men but was committed to the extent of having the matter brought before this convention for action. In the report of the ways and means committee which has been presented we have made a recommendation to prevent further deficits. We certainly do not want the supply men to pay our debts and run this convention. We do not intend that they shall do that; but as long as they attend our gatherings and we depend upon them for the most interesting feature of the convention, and receive a thousand dollars from their Montreal exhibit to help us along, the committee thinks they should in some way be connected with us. We believe that the adoption of the report will give the association the revenue it so badly needs to enlarge its field and scope. The National Electric Light Association has associate members, and raises a large revenue. The supply men do not annoy them. I have been a member of the Institution of Mining Engineers for many years, with a very large membership, of which the greater part are associate members. We can therefore follow the successful experience of kindred organizations.

As to the plea that we need secret meetings, I would state that I have not attended many meetings, but have attended enough to know that there is no discussion, action or paper presented to this convention that does not find its way into the technical press, accompanying a general outline of all the business we transact. I said to the executive committee of the association while in session that I believed there was something radically wrong with our organization, that while there is a very large number of street railroad companies in the country, we have only 166 members, and as a remedy I urge that we shall make the meetings so interesting by the reading of papers, by our exhibit, and in some other ways that all would join. I do not believe that there is any necessity for secret sessions of this association. If there should be great necessity at times for executive session, we have that privilege under the Constitution and By-Laws; but that is no reason for excluding the supply men from membership in the association for so unimportant a reason. If they want to find out what has been done in any of our so called secret sessions they can do so from some member present, just as the reporters do in the United States Senate, when it has meetings with closed doors. This is particularly true, when we have supplymen here voting as representatives of street railway companies, and who are here in a dual

capacity. We admit them under such circumstances; why not admit all, and place this association on a solid financial basis?

I will give as much time and as much money as any member of the association towards its success. The committee has made the recommendation as to associate membership for the welfare and good of the association."

Mr. Green, of St. Louis: "I am sorry that questions of this kind should come into this association. I have attended almost every meeting, and we have never had any discussion about financial matters, or about supply men or any other matters which would tend to disrupt the pleasant memories we have had for fourteen years. When this convention was organized, or shortly after, when the meeting was held in St. Louis, there was no question about banquet tickets or supply men. The St. Louis railroad companies paid for the banquet and the entertainment of the members of the association. There was no question about five dollars from this one, and that one; we brought them there and entertained them and paid all the expenses.

As to the supply men, there would not be a corporal's guard in this convention but for the supply men. They spend their money and are the life and soul of this convention. You find them in the convention headquarters with a big roll of bills, spending their money, and bringing their exhibits here and putting them in the hall at enormous expense, to show you the latest developments in the street railway business, and it does not cost the members a cent. They supply our material, and build our roads, and are willing to take our bonds, and why in the name of common sense do we not want them with us? They have attended every convention since the beginning. We are not calling upon them to pay our debt. That will be wiped out before these gentlemen are to be taken in. It is to be provided for by subscription among the members of the association, not by the supply men. Some man here has a road that makes, perhaps two or three hundred thousand dollars a year, and subscribes \$50, and there are others representing roads with an income of several million dollars, and they only subscribe \$50, that is not right or just. My name is down for \$50, and my road does not earn \$300,000. Shame on these men, and then they come and tell you, supply men should not be admitted. The supply men started the convention, if the facts were known. What would there be in the Victoria Rink, if the supply men were not here? They come ahead of the meeting and they stay after we are gone, and to their credit be it said they pay their bills all the time. I want this report adopted, and adopted unanimously. If you exclude these gentlemen, who are the mainspring of this convention, good-bye to the American Street Railway Association. You will make a serious mistake if you reject the report of the ways and means committee."

Mr. McLean moved the adoption of the report.

Mr. Seely, of New York: "I will give \$100 without any condition. I build railroads, and I sell them: You all do it, you are all supplymen. I am with the supplymen, or I am against them, according to circumstances. When Mr. Thompson spoke, I was confident he was not aware of the condition of affairs in this association. I am sure he has the greatest respect for all supplymen, but he objects and so do a great many of the members of the association to being forced to subscribe to a fund upon conditions. I subscribe \$100 to a fund for liquid-

ating the debt, without any condition whatever. How many in this association will get up and subscribe without any condition?"

Mr. Hamilton, of St. Louis: "We will pay one-twentieth of the debt."

Mr. Scullin, of St. Louis: "We will pay one-twentieth of the debt."

The question was called for on Mr. McLean's motion

Mr. Seely: "May I ask one question before the motion is put? Have you any objection to dividing the report? Take the recommendations as to the admission of supplymen: let us vote upon that. It will give the members an opportunity to declare themselves."

Mr. Harrison: "I cannot consent to the separation of the report without asking the approval or disapproval of the proposition by the other members. I am willing to do anything the convention authorizes."

Mr. McLean renewed his motion to adopt the report.

Mr. Thompson moved to strike out that part of the report which relates to the adoption of the amendment to the Constitution and By-Laws. This motion was put and carried.

Mr. Goff, of Fall River, moved that the report of the committee be laid on the table. This motion was carried, 37 to 11.

Mr. Hurt: "I now move that a census of this meeting be taken on the proposition to see how many companies here are willing to subscribe \$100 apiece: we then propose to see how many will subscribe \$50, then \$25, then \$15, and then \$10, until we can get the money, upon condition that all the funds are raised here." The motion was carried. The chair then stated that subscriptions would be received, according to the plan adopted.

Before the words were fairly out of the chairman's mouth, Capt. McCulloch, of St. Louis, had sprung to his feet and, amid applause and enthusiasm, constantly increasing, called out, one by one, a hundred-dollar subscription for each of his seven roads, and from that instant the good work progressed rapidly, with several members on the floor at once, calling out their subscriptions. Following is the list:

Union Depot Railroad Company, St. Louis.....	100.00
Lindell Railway Company, St. Louis.....	100.00
Missouri Railroad Company, St. Louis.....	100.00
St. Louis Railroad Company, St. Louis.....	100.00
Citizens' Railroad Company, St. Louis.....	100.00
Southern Railroad Company, St. Louis.....	100.00
Cass Avenue & Fair Grounds Railway Company, St. Louis.....	100.00
Chicago City Railway Company.....	100.00
Covington & Cincinnati Street Railway Company.....	100.00
Camden, Gloucester & Woodbury Street Railway Company.....	100.00
Atlanta Consolidated Street Railroad Company.....	100.00
Lock Haven Street Railroad Company, Lock Haven, Pa.....	100.00
Williamsport Passenger Railway Company.....	100.00
West End Railroad Company, Boston.....	100.00
Twin City Railroad Company, St. Paul.....	100.00
Twin City Railroad Company, Minneapolis.....	100.00
Wilkes-Barre & Wyoming Valley Traction Company.....	100.00
Reading Traction Company.....	100.00
Cleveland City Railway Company.....	100.00
Louisville City Railway Company.....	100.00
Lehigh Traction Company, Hazleton, Pa.....	100.00
North Chicago City Railway Company.....	100.00
Bridgeport Traction Company.....	50.00
Newark and South Orange Railroad Company.....	50.00
New Brunswick Traction Company.....	50.00
Winchester Avenue Railway Company, New Haven.....	50.00
Manchester Street Railway Company.....	50.00
Montreal Street Railway Company.....	50.00
Ottawa Electric Railway Company.....	50.00

Columbus Street Railway Company	50.00
Brooklyn City and Newtown Railroad Company.....	50.00
Consolidated Street Railway Company, Worcester.....	50.00
Citizens' Street Railroad Company, Indianapolis	50.00
Burlington Railway Company.....	50.00
Hartford Street Railway Company.....	50.00
Union Railroad Company, Providence.....	50.00
Terre Haute Electric Railway Company	50.00
Troy City Railway Company.....	50.00
Globe Street Railway Company, Fall River.....	50.00
Omaha Street Railway Company	50.00
Paterson Railway Company.....	50.00
Scranton Traction Company.....	50.00
Toronto Railway Company	50.00
Taunton Street Railway Company.....	25.00
New Haven Street Railway Company	25.00
St. Joseph & Benton Harbor Electric Railway & Light Company.....	25.00
Akron Street Railway Company	25.00
Wayne & Fifth Street Railroad Company, Dayton.....	25.00
Consumers' Electric Light & Street Railway Company, Tampa, Fla.....	25.00
Des Moines City Railway Company	25.00

Total.....\$3,425.00

Mr. Scullin, of Louis: I move that any companies that have already subscribed be given the privilege of increasing the subscription. Carried.

The following additional subscriptions were then made:

St. Louis railroad companies, first named	\$100.00
Union Depot Railroad Company, St. Louis	100.00
Chicago City Railway Company.....	100.00
Twin City Railway Company, St. Paul	100.00
Twin City Railway Company, Minneapolis.....	100.00
Camden, Gloucester & Woodbury	50.00
Montreal Street Railway Company	50.00
Atlanta Consolidated Street Railroad Company.....	50.00
St. Louis Railroad Company	50.00

\$700.00

Mr. Wyman, of Milwaukee: "I have been anxious to enter into this subscription, but there are certain legal complications which surround our road, which make it impossible for us to enter upon a subscription of this kind. I, however, personally pledge the amount of \$50."

Milwaukee Street Railway Company.....\$50.00

Mr. Fairchild: "The West Chicago Street Railroad Company has no person here authorized to pledge that road for any amount of money; but I am sure the manager of that company, were he present, would be one of the first to subscribe \$100. I will take the responsibility, as long as no one else is here, to pledge that company for \$50."

West Chicago Street Railroad Company.....\$50.00

John A. Seely announced the following subscriptions:

H. M. Littell.....	\$100.00
J. A. Bailey.....	100.00
J. Willard Morgan.....	25.00
New Bedford Street Railway Company.....	25.00

\$250.00

Total subscriptions.....\$4,475.00

Mr. Thompson; "I move that the secretary be instructed to give every company an opportunity to add to this fund." Carried.

The nominating committee presented the following recommendations for officers for the ensuing year:

For President—H. M. Littell, Brooklyn, N. Y.

First Vice-President—Granville C. Cuninghame, Montreal.

Second Vice-President—William H. Jackson, Nashville, Tenn.

Third Vice-President—J. Willard Morgan, Camden, N. J.

Secretary and Treasurer—T. C. Penington, Chicago, Ill.

EXECUTIVE COMMITTEE.

Joel Hurt, Atlanta, Ga.; Prentiss Cummings, Boston, Mass.; C. G. Goodrich, St. Paul, Minn.; A. Markel, Hazleton, Pa.; W. P. Kelly, Columbus, O.

Place of next annual meeting, St. Louis, Mo.

The report was unanimously adopted and the secretary cast one ballot, and the gentlemen were declared duly elected.

The report of D. G. Hamilton and Robert McCulloch, committee on the "Use of Salt and Sand on Street Railway Tracks," was as follows.

Use of Salt and Sand.

Your committee appointed to report upon the necessity for the use of salt and sand upon street railway tracks during the winter, in order to remove ice and snow, and make the running of cars safe and practicable, begs to submit the following report:

The use of salt on the rails at certain times and during certain conditions of weather is absolutely necessary in order to clear the rails of a film of ice that will otherwise form on them. Without the use of salt it would be very unsafe to operate cars on a hilly system during winter and your committee is of the opinion that no road can afford to dispense with its use. Salt has been used on street railways throughout the United States constantly while horse cars were in vogue, and now more than before is its use imperative in the operation of electric cars.

In like manner, sand is a necessity on the rails in order to give the wheel a "proper grip" on the track.

In the city of St. Louis, Mo., the quantities of salt dumped on the tracks is in excess of 3,000 tons in the course of one winter. There is no objection on the part of the local authorities or health board, to its use, and but for the use of this salt, it would be impossible to operate our cars. The use of sand is also absolutely necessary, and its use is not interfered with in any manner, any more than is the use of salt.

The report of the committee was adopted and ordered printed.

Vice-President Harrison then took the chair and a vote of thanks was tendered the retiring officers and executive committee.

Mr. Harrison: "As chairman of the committee appointed to devise ways and means, I desire to say that he consistently and persistently followed what he deemed to be a proper course of duty. The convention has made a decision on that question, and the chairmen of the committee accepts the decision with perfect good feeling for every member of the association; and I believe I have the right to say that I express the sentiments of all the committee. I have not had time nor opportunity to confer with it, and in the absence of the gentlemen I will state to the convention that they accept this decision as settling that matter, and that we congratulate the association upon raising the money which will result in wiping out the debt; and for your courtesy and kindness to me aside

from my duties as chairman of the committee, I thank the convention. I hope in the future that my relations with the association will prove that while I differ with a majority on one point, I am loyal to the American Street Railway Association.

Friday Morning Session.

On being called to order at 11 o'clock, the subject of "Furnishing Free Music and other Entertainments by the Street Railway Companies to the Public" was announced,

Mr. McLean, of Indianapolis: "The Citizens' Railway Company owns the only park of any size in the city of Indianapolis. It comprises 265 acres, and we find it very profitable during the summer to give entertainments there, particularly in the way of band concerts, and they have attracted many thousands to the park, especially Sunday afternoons and evenings."

Mr. McClary, of Birmingham: "We have a park of about 100 acres, with a lake 33 acres in size, with pavilion, walks and drives, and every week day night except Saturday, during the summer, we have a band playing music for dancing. Every Sunday afternoon we have a sacred concert, and find it profitable."

Mr. Scullin: "I would like to ask if it is not a fact on account of these large crowds congregating at one point, and being desirous to get away in a short time, there is not a greater liability for accidents, especially in putting on extra cars and allowing green men to handle them. I would like to ask the gentlemen who have spoken on the subject if they have had any such experience."

Mr. McLean: "So far as our road is concerned, we have been free from accidents at these unusual gatherings. We had the encampment of the state militia in our park this summer, which resulted in a very handsome gain in receipts, and it taxed our facilities to the utmost to carry the people to and from the park, during that week and there was not a single accident."

Mr. McClary: "We have never had an accident in carrying away these crowds that collect at the parks on account of these entertainments. For two years we have had the state militia encampments and had as many as eight thousand people at a time in the grounds, to bring away at one time, as soon as we could get them away, and have never had an accident."

Mr. Hurt: "As the result of special inquiry on that very point I have gathered the impression that during the time that large crowds gather for pleasure at resorts of this kind every one is on the qui vive, so to say, and there are fewer accidents and less disposition to make complaints to the companies; and if an accident does occur we are less liable to hear from it than on ordinary occasions."

Mr. Penington: "In Chicago on 'Chicago Day' at the World's Fair we carried 800,000 people, and the most serious accident we had was that some one shoved a man off a car and hurt his arm. It seems at a time

like that as if everybody was on the lookout and avoided danger."

J. F. McElroy addressed the meeting on the subject of Electric Heaters for Street Railway Cars, illustrating his remarks with a number of diagrams. On motion of Mr. Harrison the meeting passed a vote of thanks for the remarks.

The committee on resolutions presented the following report:

RESOLVED, That the American Street Railway Association in convention assembled expresses the heartfelt appreciation of its members of the many acts of hospitality and courtesies extended them by the citizens of Montreal and by the officials of the Montreal Street Railway Company: and that we give assurances to both of a grateful remembrance. We came among them as strangers and found in their houses and hearts a heart welcome and a love corner—a greeting long to be remembered, and the separation which now comes will be long regretted.

To one and all we extend a hearty invitation to our next meeting, there we hope to extend our best welcome.

Respectfully submitted,

H. M. WATSON,
D. G. HAMILTON,
E. S. GOODRICH.

The resolution was unanimously adopted.

The chair appointed Messrs. Hamilton and Harrison a committee to escort the newly-elected president and secretary to the platform, where they were duly installed and acknowledged their election with thanks: pledging their best efforts in the development of the association.

The meeting then adjourned, to meet in St. Louis the third Tuesday in October, 1896.



The banquet was given in the spacious dining hall of the Windsor, the tables and walls of which were prettily decorated with flowers and flags of the two countries. After the dinner the following toasts were responded to, those of the Queen and the President of the United States being loudly cheered.

"Her majesty the Queen;" Joel Hurt, toastmaster, Atlanta. "The President of the United States" responded to by United States Consul General, Dr. Anderson, Montreal. "The City of Montreal," by his worship, Mayor Villeneuve. "The American Street Railway Association," Col. A. A. Stevenson, of Montreal. "The Montreal Street Railway," Granville Cuninghame, Montreal. "Our Guests" by Sir Alexander Lacoste and Hon. Senator Ogilvie. "The Ladies" J. H. Stedman, Rochester. "The Technical Press," C. W. Price, New York, "Our Next Merry Meeting," Col. Cunningham, Boston.

To Americans, a novel part of the introduction accorded each speaker as he rose, was that of those present ris-

ing to their feet, and accompanied by the orchestra singing one verse of "He's a Jolly Good Fellow." During



14th Annual Convention

BANQUET

17th Oct 1895.

WINDSOR HOTEL
MONTREAL

the evening the national airs of both countries were played. The party left the banquet hall to the strains of Yankee Doodle.

POINTERS GATHERED AT DETROIT.

On the invitation of the Steel Motor Company, Cleveland, through G. W. Henry, western sales agent, Chicago, a party of returning street railway managers and supply men stopped off at Detroit. At the Wabash depot, A. B. Dupont, general manager of the Detroit Citizens' Street Railway, and G. S. Hazard, superintendent of the Fort Wayne & Belle Isle Railway Company were in waiting. The party was taken to the general offices of the Citizens' Company, which uses steel motors and controllers, exclusively, where they were received by J. C. Hutchins, vice-president and treasurer; A. E. Peters, secretary; and John Grant, superintendent. Escorted by Mr. DuPont and Mr. Grant, the visitors were taken over a portion of the lines of the company in a special car and visited the Jefferson avenue car house. Here a careful inspection was made of an unmounted Steel motor and controller. In the house were a number of 22-foot vestibule cars, made over from old 16-foot cars, three old cars making two new ones, the expense being \$260 for each new car turned out. One car is cut in two in the middle and the other two cars are cut between the first and second windows at each end. One half car is spliced to each of the middle sections of the other two cars, which leaves two ends to throw away. New floors, new seats and new sills are required. When the cars are varnished, it is impossible to discover the splice. The entire platform is protected by a heavy buffer which takes the shape of the vestibule, and will protect the car from damage in case of collision. All cars are mounted on DuPont trucks, equipped with the DuPont brake.

Manager DuPont has a new style of sign for the sides and front of cars. The signs for the sides of the cars are placed upon the roof. They are made of wood with the letters cut out instead of painted. The back of the sign is covered with a thin strip of white celluloid, that emphasizes the letters. As the ventilator glass is plain, the light shines through, making the sign as legible in the night as in the day. Small detachable iron signs like those shown herewith, to designate through cars are placed in a socket on top of the hood. The letters are cast in the iron, and a piece of white celluloid at the back brings the letters into prominence. The headlight being on the dome, some of the rays of light pass through the sign, so it can be easily read at night. Mr. DuPont has a method of tearing up pavement that is quite startling in its originality. He makes a car do this work,



thereby saving a large sum for labor and being able to accomplish in one round trip over his lines, what would require days for a gang of men with picks and shovels. For ripping up asphalt at the side of the track, a chisel 3 inches wide and 1/4-inch thick is attached to the front end of the truck at its outer edge, and the car is started. The effect is the breaking of the pavement the entire length of the line to a width of about two feet, leaving a straight edge at the road bed, which is uninjured. When Mr. DuPont told F. E. Osborne, who is installing Steel motors on the Citizens' Railway, what he intended to do, Mr. Osborne replied that he thought the work was so severe it would burn out the motors before the end of the trip. "What if it does?" asked Mr. DuPont. "I can afford to burn out two or three a night, to get the work done, on account of the saving in time and labor to do the same work in the old way." So the car started, and the motors have not burned out, although they have been put to the test many times on different lines of the company. The pavement between tracks is torn up by drags attached to the rear of the car. This work is done at night and in the morning the debris is carted away by teams.

The guests of the Steel Motor Company were :

C. G. Goodrich, Twin City Company, Minneapolis.
C. F. Holmes, Metropolitan Street Railway, Kansas City.
W. Worth Bean, St. Joe and Benton Harbor, Michigan.
George B. Hippee, Des Moines Street Railway Company.
W. G. Owen, Des Moines Street Railway Company.
E. G. Connette, Nashville Street Railway Company.
W. L. Furguson, Decatur, Illinois, Street Railway Company.
E. D. Dubois, Calumet Electric, Chicago.
John Hulsizer, Joliet, Illinois, Street Railway Company.
W. W. Davis, Metropolitan Street Railway, Kansas City.
W. A. Satterlee, Metropolitan Street Railway, Kansas City.
W. J. Cooke, McGuire Manufacturing Company, Chicago.
A. S. Littlefield, Johnson Company, Chicago.

E. J. Noble, Prouty-Noble Brake, Chicago.
E. S. Nethercut, Paige Iron Works, Chicago.
E. C. Noe, General Electric Company, Chicago.
P. C. Ackerman, American Electrical Works, Providence.
George S. Whyte, Badger Manufacturing Company, Chicago.
A. N. Loper, New Haven Car Register, Chicago.
G. W. Henry, Steel Motor Company, Chicago.
F. E. Osborne, Steel Motor Company, Cleveland.
E. E. Grace, Portable Hose Bridge Company, Detroit.
E. A. Wurster, Falk Manufacturing Company, Milwaukee.
A. Hoffman, Falk Manufacturing Company, Milwaukee.
STREET RAILWAY REVIEW, Chicago.

THOSE PRESENT.

The list of those present is compiled from the official record of the association kept by Martin H. Watts, private secretary to General Manager Cuninghame of the Montreal Street Railway Company. For the first time in the history of the association a record was kept that was of any value to the delegates and supplymen. A large double index was prepared, the front half containing an alphabetical list of members, and the latter portion an alphabetical list of supplymen. Delegates registered under the name of their roads, while the supplymen registered under the letters of their own names. A record of buttons, banquet tickets and invitations issued was kept in connection with each name. By this system, supplymen and delegates could find out if any particular person whom they wished to see was in the city. The system was very simple and great credit is due to Mr. Watt's ingenuity for its inception.

DELEGATES AT MONTREAL.

Akron, O.—W. D. Chapman, general superintendent Akron Street Railroad Company.
Atlanta, Ga.—Joel Hurt, president Atlanta Cons. Street Railway Company.
Baltimore, Md.—S. B. Thompson, master mechanic City & Suburban Railway.
Birmingham, Ala.—J. B. McClary, superintendent Birmingham Railway & Electric Company.
Boston, Mass.—Chas. S. Sergeant, general manager West End Street Railway Company.
Boston, Mass.—D. F. Longstreet, ex-president A. S. R. A.
Bridgeport, Conn.—N. H. Heft, president; Andrew Radel, general superintendent; C. J. Field, construction engineer, and Henry Selzer, jr., Bridgeport Traction Company.
Brockton, Mass.—Horace B. Rogers, general manager, and John P. Morse, Brockton Street Railway Company.
Brooklyn, N. Y.—H. M. Littell, president Atlantic Avenue Railroad Company.
Duncan, B. Cannon, secretary Brooklyn City & N. Railroad Company.
Buffalo, N. Y.—H. M. Watson, president; F. O. Rusling, superintendent, and H. P. Brown, construction engineer, Buffalo Railway Company.
Butte, Mont.—J. S. Wathey, superintendent Butte Consolidated Street Railway Company.
Braintree, Mass.—Benj. J. Weeks, Holbrook Street Railway Company.
Brantford, Ont.—Frederic Nicholls, president Brantford Street Railway Company.
Belleville, Ont.—T. C. Lazier, manager Belleville Street Railway Company.
Buffalo, N. Y.—Richard E. Danforth, superintendent B. & L. Railroad Company.
Bay City, Mich.—C. C. Rush, manager Bay City Consolidated Railroad Company.
Camden, N. J.—J. W. Morgan, president; Wm. J. Thompson, treasurer; Thos. P. Curley, secretary; Henry J. West, director; and Horace M. Royal, superintendent, Camden G. & W. Railway Company. Samuel J. Fenner, superintendent, and W. E. Harrington, electrical engineer, Camden Horse Railroad Company.
Carbondale, Pa.—J. W. Aitken, general manager, and D. J. Duncan, general superintendent, Lackawanna Valley Rapid Transit Company.
Chicago, Ill.—E. D. Dubois, superintendent Calumet Electric Street Railway Company. T. C. Penington, treasurer; Frank R. Greene, secretary, and R. J. Hill, mechanical engineer, Chicago City Railway Company. B. J. Jones, superintendent South Chicago City Railway Company. J. Millar, master mechanic North Chicago Street Railroad Company. F. L. Fuller, superintendent; F. T. C. Brydges, superintendent car shops, and C. B. Fairchild, West Chicago Street Railroad Company.
Cincinnati, O.—H. P. Bradford, general manager Cincinnati Incline Plane Railway Company.
Cleveland, O.—George G. Mulhern, superintendent Cleveland City Railway Company.
Columbus, O.—W. F. Kelly, general superintendent Columbus Street Railway Company.
Concord, N. H.—D. Waldo White, Concord Street Railway Company.

Cottage City, Mass.—John A. Duggan, Cottage City Railway Company.
Council Bluffs, Iowa.—W. S. Dimmock, Omaha & Council Bluffs Railway & Bridge Company.
Covington, Ky.—T. M. Jenkins, general manager South Covington & Cincinnati Street Railway Company.
Danbury, Conn.—S. C. Holly, president Danbury & Bethel Street Railway Company.
Dayton, O.—Ezra Binn, vice-president, and Nelson Routzahn, superintendent, Wayne & Fifth Street Railroad Company.
Decatur, Ill.—W. L. Ferguson, president City Electric Railway Company.
Derby, Conn.—H. Holton Wood, president, and B. W. Porter, Derby Street Railway Company.
Des Moines, Iowa.—G. B. Hippee, general manager; W. G. Owens, superintendent, and J. S. Polk, Des Moines City Railway Company.
Detroit, Mich.—N. W. Goodwin, secretary, and Edward Grace, Fort Wayne & Belle Isle Railway Company. Charles H. Swift, president Wyandotte & Detroit River Railway Company.
Fall River, Mass.—Robert S. Goff, treasurer Globe Street Railway Company.
Fishkill, N. Y.—John T. Smith, president Citizens' Street Railway Company.
Fitchburg, Mass.—Robert N. Wallis, treasurer, and G. H. R. Preble, superintendent, Fitchburg & Leominster Railway Company.
Girardville, Pa.—E. W. Ash, general manager Schuylkill Traction Company.
Geneva, N. Y.—J. T. Ringway, Geneva Street Railway Company.
Gloucester, Mass.—Willard B. Ferguson, president, and Herbert D. Bosson, Gloucester Street Railway Company.
Grand Rapids, Mich.—G. S. Johnson, general manager Consolidated Street Railway Company.
Hamilton, Ont.—B. E. Charlton, president Hamilton Street Railway Company, John Patterson, Hamilton Radial Electric Railway Company.
Hamilton, Ont.—W. W. Dean, electrical engineer Hamilton Street Railway Company.
Harrisburg, Pa.—F. R. Musser, superintendent East Harrisburg Street Railway Company.
Hartford, Conn.—E. S. Goodrich, president, and William Granten, Hartford Street Railway Company.
Hazleton, Pa.—A. Markle, general manager, and Geo. W. Thompson, superintendent, Lehigh Traction Company.
Indianapolis, Ind.—Thomas H. McLean, general manager Citizens' Street Railway Company.
Johnstown, Pa.—E. B. Entwisle, Johnstown Passenger Railway Company.
Joliet, Ill.—John Hulsizer, Joliet Street Railway Company.
Kansas City, Mo.—William S. Satterlee and C. F. Holmes, Metropolitan Street Railway Company.
Kingston, Ont.—J. M. Campbell, Kingston Street Railway Company.
Lancaster, Pa.—William A. Armstrong, jr., superintendent Pennsylvania Traction Company.
Lawrence, Mass.—Charles A. Clark and Charles A. Richardson, Lowell, L. & H. Railway Company.
Lock Haven, Pa.—C. A. Bragg, John A. Seely and James P. McQuaide, Lock Haven Electric Railway Company.
London, Ont.—Charles E. A. Carr, general manager London Street Railway Company.
Long Island City, N. Y.—George Chambers, general manager Steinway Railway Company.
Louisville, Ky.—T. J. Minary, general manager, and J. O. Haddox, superintendent, Louisville Railway Company.
Lowell, Mass.—Willard B. Ferguson, president Lowell & Suburban Railway Company.
Lowell, Mass.—Israel A. Kelsey, director Lowell & Suburban Railway Company.
Lynn, Mass.—J. H. Cunningham, director Lynn & Boston Railroad Company.
Washington G. Benedict, president Boston & Revere Electric Railway.
Manchester, N. H.—Charles Williams, president; N. H. Walker, manager; Arthur H. Williams, director, and J. H. Gallinger, Manchester Street Railway Company.
Milwaukee, Wis.—C. D. Wyman, general manager Milwaukee Street Railway Company.
Minneapolis, Minn.—C. G. Goodrich, vice-president, and E. P. Burch, engineer, Twin Cities Rapid Transit Company.
Mobile, Ala.—John S. Pugh, Mobile Street Railway Company.
Montreal, Can.—Louis Beaubien, president; Henry Holgate, manager; Joseph R. Roy, chief engineer, and Albert J. Corriveau, Montreal Park & Island Railway Company. E. Lusher, secretary and treasurer; J. F. Hill, comptroller; D. McDonald, superintendent, and K. W. Blackwell, director, Montreal Street Railway Company.
Nashville, Tenn.—W. H. Jackson, president, and Edward G. Connette, general manager, Nashville Street Railway Company.
Newark, N. J.—Andrew Radel, superintendent, and C. J. Field, contracting engineer, Newark & South Orange Railway Company.
New Bedford, Mass.—E. E. Potter, superintendent; C. S. Mendell, electrical engineer, and A. C. Gardiner, Union Street Railway Company.
New Britain, Conn.—E. A. Breed, engineer Central Railway & Electric Company.
Newburgh, N. Y.—W. F. Hogan, Newburgh Electric Railway Company.
Newport, R. I.—Robert P. Lee, superintendent Newport Street Railway Company.
Newburyport, Mass.—James F. Shaw and H. F. Eldridge, Haverhill & Amesbury Street Railway Company. Charles Odell, president; Warren Shaw and William P. Clark, Newburyport & Amesbury Horse Railway Company.
New Haven, Conn.—Albert C. Pond, president; Israel A. Kelsey, general manager, and Charles E. Graham, Winchester Avenue Railroad Company.
New Haven, Conn.—G. A. W. Dodge, New Haven Street Railway Company.
New York, N. Y.—E. T. Landon, secretary Dry Dock, E. B. & B. Railroad Company.
Niagara Falls, Ont.—F. R. MacKenzie, manager, and W. Phillips, electrical engineer, Niagara Falls Park & River Railway Company.
New Brunswick, N. J.—William Silver and F. W. Parrott, Brunswick Traction Company.
Norwalk, Conn.—E. J. Hill, president, and W. F. Acton, secretary, Norwalk Street Railway Company.

Norwich, Conn.—W. G. Benedict, director, and W. S. Silver, secretary, Norwich Street Railway Company.

Norwalk, Conn.—W. S. Bushnell, Norwalk Traction Company.

New Orleans, La.—Frank R. Ford, manager Canal & Claiborne Railroad Company. North Staffordshire, England.—W. J. Carruthers-Wain, C. E., North Staffordshire Tramways Company.

Omaha, Neb.—W. A. Smith, general manager Omaha Street Railway Company.

Ottawa, Ont.—J. W. McRea, president; W. Y. Soper, vice-president; T. Ahearn, managing director; J. D. Fraser, secretary and treasurer; J. E. Hutcheson, superintendent, and W. W. Wylie, superintendent, Ottawa Electric Railway Company.

Paterson, N. J.—M. R. McAdoo, general manager Paterson Central Electric Railway Company and Paterson Railway Company.

Philadelphia, Pa.—A. L. Johnston, electrical engineer Hestonville, M. & F. Railroad Company. George Lodge, manager, and J. O. McLaughlin, E. M. Traction Company. J. C. Lugar, general manager, and John A. Brill, director, Manayunk & R. Incline Plane & Railway Company.

Pittsburgh, Pa.—G. F. Greenwood, general manager Allegheny Traction Company. J. E. Rugg, general manager Citizens' Traction Company. G. F. Greenwood, general manager Pittsburgh, A. & M. Traction Company. J. G. Traggardh, secretary and treasurer, and William L. Elkins, general manager, Pittsburgh Traction Company.

Port Huron, Mich.—William Canham, president; W. L. Jenks, treasurer, and A. Dixon, manager, City Electric Railway Company.

Providence, R. I.—A. T. Potter, general manager Union Railroad Company.

Portland, Me.—William R. Wood, president Portland Railroad Company.

Plymouth, Mass.—C. E. Barnes, Plymouth & Kingston Street Railway Company. Quincy, Mass.—Benj. J. Weeks and John A. Duggan, Quincy & Boston Street Railway Company.

Quebec, Can.—Edward A. Evans, Quebec, M. & C. Railway Company.

Reading, Pa.—John A. Rigg, president, and W. H. Hennburg, jr., assistant to president, Reading Traction Company.

Rochester, N. Y.—Chas. A. Williams, secretary; Joseph W. Hicks, superintendent, and J. H. Stedman, manager of transfers, Rochester Railway Company.

Rockland, Me.—George E. Macomber, president; S. M. Price, vice-president, Thomas Hawkin, superintendent, and H. C. Weston, electrician, Rockland, T. & C. Street Railway Company.

Sandusky, O.—Frank J. J. Sloat, Sandusky Street Railway Company.

Scranton, Pa.—Frank Silliman, jr., general manager Scranton Traction Company.

Springfield, Mass.—George F. Reed, electrical superintendent Springfield Street Railway.

Springfield, O.—S. L. Nelson, general manager, and C. C. Rush, superintendent, Springfield Street Railway Company.

Steelton, Pa.—Mason D. Pratt, engineer Middletown, H. & S. Street Railway Company.

St. Joseph, Mich.—W. Worth Bean, president, and H. C. Mason, superintendent, St. Joseph & B. H. Railway & Light Company.

St. Louis, Mo.—Robert McCulloch, general manager Cass Avenue & F. G. Railway Company. George D. Rosenthal, Lindell Railway Company. James F. Davidson, superintendent, and A. C. Thompson, mechanical engineer, Missouri Railroad Company. Charles Green, president People's Railway Company. John C. Allen, superintendent, and F. W. Shelton, engineer, Southern Electric Railway Company. D. G. Hamilton, president St. Louis Railroad Company. Henry Scullin, general manager, and E. C. Noe, Union Depot Railway Company. H. A. Rockwell, electrical superintendent St. Louis Suburban Railway Company.

St. Johns, N. B.—H. Brown, St. Johns Railway Company.

Tampa, Fla.—J. T. Douglass, Consumers' Electric Railway Company.

Taunton, Mass.—Geo. C. Morse, general manager, and Geo. F. Seibel, Taunton Street Railway Company.

Terre Haute, Ind.—Russell B. Harrison, president Terre Haute Street Railway Company.

Toledo, O.—Charles L. Wight, secretary Toledo Consolidated Street Railway Company.

Toronto, Ont.—James Gunn, superintendent; J. M. Smith, comptroller, and Chas. E. L. Porteous, Toronto Street Railway Company. Charles Morton, Toronto Suburban Railway Company.

Trenton, N. J.—Henry C. Moore, Trenton Passenger Railway Company.

Troy, N. Y.—Charles H. Smith, superintendent, and J. H. Jones, Troy City Railway Company.

Victoria, B. C.—George H. Penty, Victoria Electric Railway Company.

Waterbury, Conn.—J. R. Smith, general manager, and A. M. Young, secretary, Waterbury Traction Company.

Wilkes-Barre, Pa.—John Graham, general manager, and J. C. Meixell, superintendent, Wilkes-Barre & Wyoming Valley Traction Company.

Williamsport, Pa.—Ernest H. Davis, general manager, and J. W. Cochran, assistant general manager, Williamsport Passenger Railway Company.

Wilmington, Del.—C. F. Hutchings, Wilmington City Railway Company.

Worcester, Mass.—John N. Akerman, superintendent, and C. L. West, Worcester Consolidated Street Railway Company.

Washington, D. C.—A. N. Connitt, Metropolitan Railway Company.

Windsor, Ont.—M. Coventry, president Sandwich & Windsor Street Railway Company.

PRESS REPRESENTATIVES.

Edward Caldwell, Street Railway Journal, New York.

Edward E. Higgins, Street Railway Journal, New York.

H. M. Davis, Electric Power, New York.

W. J. Johnston, Electric Railway Gazette, New York.

William Taylor, Electric Railway Gazette, New York.

J. W. Dickerson, Electric Railway Gazette, New York.

Cecil P. Poole, Electric Railway Gazette, New York.

Geo. T. Hanchett, Electric Railway Gazette, New York.

Fred De Land, Electrical Engineering, Chicago.

H. H. Windsor, STREET RAILWAY REVIEW, Chicago.

F. S. Kenfield, STREET RAILWAY REVIEW, Chicago.

H. J. Kenfield, STREET RAILWAY REVIEW, Chicago.

James Boyd, STREET RAILWAY REVIEW, Chicago.

John B. Bennett, Street Railway Journal, Chicago.

H. G. Tuckerman, Electrical Review, Boston.

E. B. Biggar, Canadian Engineer, Montreal.

B. E. Greene, Electricity, New York.

T. E. Crossman, Stenographer, New York.

W. C. Beard, The Car, New York.

W. T. Hunt, Electrical Age, New York.

Thos. R. Taltavall, Electrical Age, New York.

T. C. Martin, Electrical Engineer, New York.

A. C. Shaw, Electrical Engineer, New York.

C. B. Fairchild, Street Railway Journal, New York.

W. Forman Collins, Western Electrician, Chicago.

W. F. Osborne, Western Electrician, New York.

E. A. Simmons, Railroad Gazette, New York.

Charles W. Price, Electrical Engineer, New York.

R. W. Ryan, Stenographer, New York.

W. H. Taylor, Street Railway Journal, New York.

E. W. Wood, Electrical Industries, Chicago.

W. E. Partridge, Street Railway Journal, New York.

E. Myerson, Stenographer, New York.

REPRESENTATIVES OF SUPPLY HOUSES.

Allison, Giles G., St. Louis Register Company, St. Louis.

Atkinson, J. W., Forest City Electric Company, Chicago.

Ackerman, P. C., American Electrical Works, New York.

Auchincloss, John, E. M. T. Company, Philadelphia.

Allyn, Charles B., Brooklyn Supply Company, Brooklyn.

Adams, jr., H. C., Phillips Iron Wire Company, New York.

Allen, W. B., Brownell Car Company, St. Louis.

Allen, Rodney D., Smethurst & Allen, Philadelphia.

Atkinson, F. W., Bell Telephone Company, Montreal.

Baylis, R. V., Walker Manufacturing Company, Cleveland.

Bradley, John S., New Haven Car Register Company, New Haven.

Billings, William R., Taunton Locomotive Manufacturing Company, Taunton.

Brill, John A., J. G. Brill Company, Philadelphia.

Bushe, J. F., Keller Printing Company, New York.

Bruckman, S. E., St. Louis Electric Eng. Company, St. Louis.

Bailey, Geo. C., John A. Roebbing's Sons Company, Chicago.

Brown, R. S., Westinghouse Electric & Manufacturing Company, Pittsburg.

Barnard, J. H., Telephone Signal Company, New York.

Burnstine, Albert, Berlin Iron Bridge Company, East Berlin, Conn.

Beard, W. W., Lombard Hydraulic Brake, Boston.

Boyd, F. C., New Haven Car Register Company, New Haven.

Baumgartner, S., Massachusetts Car Company, Boston.

Beale, Edward, Railway Register Manufacturing Company, New York.

Burns, Charles F., Charles F. Burns Company, Rochester.

Baker, jr., C. O., National Electric Light Association, New York.

Barrett, C. E., The Hale & Kilburn Manufacturing Company, Philadelphia.

Bonner, W. T., Babcock and Wilcox Company, New York.

Barber, A. G., Valentine & Co., New York.

Bigelow, H. T., Hale & Kilburn Company, Philadelphia.

Coleman, Charles E., Mica Insulator Company, New York.

Christie, W. E., Ottawa Carbon Company, Ottawa.

Cooke, W. J., McGuire Manufacturing Company, Chicago.

Carter, G. M., Carter Brake Company, Chicago.

Carter, Clarence W., Carter Brake Company, Chicago.

Cosper, W. P., Consolidated Car Heating Company, Chicago.

Cass, J. H., Asbestos Manufacturing Company.

Cicott, Frank X., Pettingell-Andrews Company, New York.

Condit, jr., S. B., Chase & Co.

Childs, Arthur E., Electric Storage Battery Company, Boston.

Chur, Walter, American Railway Supply Company.

Conklin, Franklin, Flood & Conklin Company, New York.

Collins, C. F., Valentine & Co., New York.

Cockey, M. R., John A. Roebbing's Sons Company, New York.

Cleveland, W. B., Forest City Electric Company, Cleveland.

Crowley, H. J., General Electric Company, New York.

Cooke, H. C., Cooke & Co., New York.

Clafin, jr., Geo. D., American Rail Joint & Manufacturing Company, Cleveland.

Curwen, Samuel M., Brill Company, Philadelphia.

Conway, M. W., Contractor, Brooklyn.

Cragin, H. A., Westinghouse Company, Pittsburg.

Collins, S. C., Stever Rail Joint Company, Cleveland.

Cooke, W. E., Peckham Motor Truck & Wheel Company, New York.

Dean, W. F., Canadian General Electric Company, Montreal.

Dingman, —, Tandem Brake Company, Toronto.

Donohue, T. E., American Electric Works, Chicago.

Daggett, jr., H. M., Lombard Hydraulic Brake Company, Boston.

Dean, D. B., Terre Haute Car Manufacturing Company, Chicago.

Dittrick C., Dittrick Brake Company, St. Louis.

DeWitt, E. F., DeWitt Sand Box Company, Lansingburgh.

Darling, George, Darling Brothers.

Dutton, W. A., Dorner & Dutton Manufacturing Company, Cleveland.

Downs, William, Fuel Economizer Company, Matteawan.

Dick, H. C., Flood & Conklin Company, Newark.

DeRonde, Frank S., Standard Paint Company, New York.

Domville, A. E., St. Thomas Car Wheel Company.

Doyle, W. L., John A. Roebbing's Sons Company, New York.

Dolph, John C., Forest City Electric Company, New York.

Daniels, A. L., H. B. Camp Company.

Estes, S. E., H. W. Johns Manufacturing Company, New York.

Evans, H. C., The Johnson Company, New York.

Evans, E. O., The Johnson Company, New York.

Evans, O. C., The Johnson Company, New York.

Edwards, Albert, Edwards Car Fender Company, Brooklyn.

- Estep, F. A., Nuttall Company, Allegheny.
Ellis, S. P., The Johnson Company, New York.
Euphrat, Theophile, Darien, Conn.
Field, Arthur W., Peckham Truck Company, Boston.
Feary, Thomas P., General Electric Company, Buffalo.
Flanders, Charles Y., Morris, Tasker & Co., Philadelphia.
Fox, Thomas, The Bushnell Company.
Furniss, George, Fire, Building & Fibre Brick Company.
Gray, Louis A., Adams & Westlake Company, Chicago.
Green, Frank J., Bushnell Car Seat Company, Easton, Pa.
Gillespie, H. F., Standard Paint Company, New York.
Gorham, Richard H., Steel Rails, Boston.
Gibson, R. B., Hunter Automatic Fender Company.
Glassford, A. W., J. Morrison Brass Manufacturing Company, Toronto.
Graham, J. H., Graham Equipment Company, Boston.
Green, Stanley, Fuel Economizer Company, Chicago.
Gordon, J. R., Westinghouse Electric & Manufacturing Company.
Godfrey, J. W., India Rubber & Gutta Percha Insulating Company, New York.
Gomer, W. E., Fuel Economizer Company, Matteawan.
Harrington, F. W., India Rubber & Gutta Percha Insulating Company, New York.
Heinrichs, Ernest A., Westinghouse Electric & Manufacturing Co., Pittsburg.
Hogan, John J., Hogan Boiler Company, Middletown.
Hensler, H., Electrical Engineering Company, St. Louis.
Henry, George W., Steel Motor Company, Chicago.
Hoffman, A. H., Falk Manufacturing Company, Milwaukee.
Holt, Pliny E., Carter Brake Company, Chicago.
Hathaway, W. K., American Electrical Works, Providence.
Harrison, H. H., General Insulator Arc Light Company, New York.
Hewitt, E. A., Bushnell Company.
Harding, H. McL., Walker Manufacturing Company, New York.
Hilton, Arthur, Massachusetts Car Company, Boston.
Hart, J. F., McPherson Sand Box Company, Troy.
Hansell, Wm. H., Charles Scott Spring Company, Philadelphia.
Hoadley, George M., Bemis Car Box Company, Springfield, Mass.
Hyde, Lewis C., Wason Car Manufacturing Company, Springfield, Mass.
Hurd, G. A., Crane Manufacturing Company, Chicago.
Haycox, W. G., Fulton Truck & Foundry Company, Mansfield, O.
Hurley, Thomas A., Holmes, Booth & Haydens, New York.
Hodges, Percy, General Electric Company.
Hanna, J. A., McGuire Manufacturing Company, New York.
Haskell, G. M., J. G. Brill Company, Philadelphia.
Hatch, E. B., The Johns Pratt Company, Hartford.
Hogan, W. F., H. W. Johns Manufacturing Company, New York.
Harmer, William J., Consulting Engineer, New York.
Hogan, William F., Contractor, Brooklyn.
Huntress, Frank C., Laconia Car Company, Boston.
Hueston, W. S., S. T. Baker & Co., New York.
Issertel, Henry G., H. W. Johns Company, New York.
Jones, F. B., Adams & Westlake Company, Chicago.
Johnston, H. C., Charles Scott Spring Company, Philadelphia.
Jackson, E. C., Jackson & Sharp Company, Wilmington.
King, C. K., Ohio Brass Company, Mansfield.
Knickerbocker, C. K., Griffin Wheel Company, Chicago.
Kent, Charles W., Walker Manufacturing Company, Cleveland.
Kennelly, J. J., Sterling Supply Company.
Keeran, N. C., City Passenger Agent Wabash Railroad, Chicago.
Keyes, Fred. A., Washburn & Moen Manufacturing Company, Worcester.
Kingston, William W., The Johnson Company, New York.
Kaufman, C. C., Street Car Fender.
Kissam, George, Carleton & Kissam, New York.
Kimball, Fred. M., General Electric Company, New York.
Kirkhouse, B. G., Montreal Electric Company, Montreal.
Lilley, L. G., Underwriters' Association, Cincinnati.
Littlefield, A. S., The Johnson Company, Chicago.
Loper, A. N., New Haven Car Register Company, Chicago.
Liggett, John C., J. R. Sterling & Co., Detroit.
Lombard, N., Lombard Hydraulic Brake Company, Boston.
Leyden, H. R., Royal Electric Company, Montreal.
Lex, F. A., A. Whitney & Sons, Philadelphia.
Luther, H. R., Barbour-Stockwell Company, Boston.
Long, E. G., Peckham Motor Truck & Wheel Company, New York.
Luscomb, H. H., Johns Pratt Company, Hartford.
Lawless, E. J., American Car Company, New York.
Leach, P. F., Bass Foundry & Machine Company, Fort Wayne.
Lewars, George H., Westinghouse Electric & Manufacturing Company.
Lyons, B. B., Brussels Tapestry Company, Chauncey, N. Y.
McElroy, James F., Consolidated Car Heating Company, Albany.
MacDuffie, R. L., Taunton Locomotive Manufacturing Company.
Meaker, J. W., Meaker Register Manufacturing Company, North Chicago.
Morris, Elmer P., General Electric Company.
Mason, W. R., Mason Electric Equipment Company.
McCartney, J. L., Ohio Brass Company, New York.
Meiklehan, T. W. R., Barnard Electric Signal & Telephone Company.
Millen, G. S., Sterling Supply & Manufacturing Company, New York.
McPherson, Alex., Alpha Rubber Company, Montreal.
Medbery, H. J., Mechanicville.
McPherson, Henry, McPherson Sand Box Company, Troy.
McDonnell, Alex., Babcock & Wilcox Company.
Milbank, L. A., Holmes, Booth & Haydens, New York.
Magee, F. A., E. S. Greeley & Co., New York.
McQuaide, Jas. P., National Conduit Manufacturing Company.
McLaren, P. M., Abendroth & Root Manufacturing Company, New York.
Morrell, Frank A., New Haven Fare Register Company, New Haven.
Montgomery, H. M., Goubert Manufacturing Company.
Meier, E. D., Heine Safety Boiler Company, St. Louis.
Mayer, Charles J., R. D. Nuttall Company, Philadelphia.
McGhie, John, General Electric Company, New York.
Morse, C. B., Jacobs Heater Company, Boston.
Mead, Frank S., Phillips Electrical Works, Montreal.
Meneely, George R., Meneely Bearing Company.
McLaren, D. W., I. C. McLaren Belting Company.
MacDonald, Jr., A. Roy, mica dealer.
Miller, J. D., Pierce & Miller Engineering Company, New York.
Mercur, R. J., New York Car Wheel Works, Buffalo.
Nethercut, E. F., Paige Iron Works, Chicago.
Newkirk, H. R., Hoefgen, Moxham & Co., New York.
Noble, E. J., Prouty and Noble Company, Chicago.
Pugh, D. W., Stephenson Company, New York.
Pugh, John S., Stephenson Company, New York.
Paige, Alonzo W., Paige Iron Works, Chicago.
Piper, Edward S., Noah L. Piper & Son, Toronto.
Peavey, M. V., Adam Cook's Sons, New York.
Perry, Charles C., Theophile Euphrat, Darien, Conn.
Powell, G. A., Packard Electric Company.
Pringle, H. E. T., Siemens & Halske Company.
Price, C. B., Pettingell, Andrews Company, Boston.
Pratt, G. E., Jackson & Sharp Company, Wilmington.
Porter, George F., secretary National Electric Light Association, New York.
Perry, J. W., H. W. Johns Manufacturing Company, New York.
Pratt, Mason D., Pennsylvania Steel Company, Philadelphia.
Partridge, Arthur S., Railway Specialties, St. Louis.
Potter, W. B., General Electric Company, Schenectady.
Ransom, Henry N., Consolidated Car Heating Company, Albany.
Rugg, E. L., Benedict & Burnham Manufacturing Company, Waterbury.
Robinson, William, Electric Truck Supply Company, Boston.
Ross, Edward L., Chapman Valve Manufacturing Company.
Russell, Harry H., E. T. Burrows Company, Portland.
Russell, F. D., Rochester Car Wheel Works, Rochester.
Reynolds, A. T., Taylor Electric Truck Company, Troy.
Randall, F. C., J. G. Brill Company, Philadelphia.
Robinson, John C., Wm. Wharton, Jr., & Co., Philadelphia.
Record, E. A., Vacuum Oil Company, Boston.
Robinson, E. P., Laclede Car Company, St. Louis.
Richards, H. T., Safety Insulated Wire Company.
Rutherford, J. A., Westinghouse Electric & Manufacturing Company, Pittsburg.
Robert, Louis E., Johnson Company, New York.
Rosenthal, George D., General Electric Company, St. Louis.
Rose, R. M., New York Fare Register Company, New York.
Rothamel, J. H., Columbia Incandescent Lamp Company, St. Louis.
Roach, M. C., G. E. P. A., N. Y. C. & H. R. R. R. Co., New York.
Range, J. W., Consolidated Car Fender Company, Providence.
Starr, D. A., Dorner & Dutton Company, Cleveland.
Shainwald, J. C., Standard Paint Company, Chicago.
Sieber, Chas. J., Allentown.
Sylvester, John E., Somerville Spike Works Company.
Stewart, B. F., Westinghouse Electric & Manufacturing Company, Chicago.
Sclater, William, Keasby & Mattison Company, Ambler, Pa.
Speer, J. S., Partridge Carbon Company, Sandusky.
Scott, Charles, Jr., Charles Scott Spring Company.
St. John, William, Safety Car Heating & Lighting Company.
Schmid, Albert, Westinghouse Electric & Manufacturing Company, Pittsburg.
Saltonstall, Philip L., General Electric Company.
Shepardson, P. A. O., New England Engineering Company.
Sharp, Edward P., R. D. Nuttall Company, Allegheny.
Schieren, Charles A., Jr., Charles A. Schieren & Co., New York.
Scarritt, Sanford G., Scarritt Furniture Company, St. Louis.
Scheffler, Fred'k A., Sterling Company, New York.
Skeen, Robert, Electric Switch & Signal Company, St. Louis.
Silver, William S., William S. Silver & Co., New York.
Sweet, D. C., Sweet Bronze Sand Box, Springfield, Mass.
Swain, H. S., Hazleton Boiler Company, New York.
Sperry, Elmer A., Sperry (E.) Railway Company, Cleveland.
Slack, W. G., Bell Telephone Company, Montreal.
Sanderson, E. A., Westinghouse Electric & Manufacturing Company.
Stanley, E. A., Canadian General Electric Company.
Strieby, F. H., General Electric Company.
Traxler, Charles, Ohio Brass Company, Mansfield.
Tolles, C. L., Jewell Belting Company, Hartford.
Taylor, John, Taylor Electric Truck Company, Troy.
Taylor, John, and Chas. E. Porter, U. S. Projectile Company, Brooklyn.
Trible, Walter P., R. D. Nuttall Company.
Turner, William S., Woodbridge & Turner Company, New York.
Thomson, Fred., Electrical Engineer, Montreal.
Thayer, Frank A., Goubert Manufacturing Company.
Trawick, S. W., General Electric Company, Atlanta.
Van Dorn, W. S., Fitzgerald-Van Dorn Company, Chicago.
Vosburgh, A. C., New Process Raw Hide Company, Syracuse.
Vos, William, Barney & Smith Company.
Vansant, H. C., Morris, Tasker & Co., Philadelphia.
Wynan, Edward B., New York.
Woodward, J. H., Benedict & Burnham Manufacturing Company.
Wendell, Jacob, Jr., Taunton Locomotive Manufacturing Company, Taunton.
Wurster, E. A., Falk Manufacturing Company, Milwaukee.
Wise, Clift, Chicago.
Wehrens, George A., Railway Joint Manufacturing Company, New York.
Walter, Franklin, F. Walter & Son.
Whyte, George S., Badger Manufacturing Company & Chicago Insulated Wire Company.
Winters, D. L., Winters Automatic Brake Company, Chicago.
Wattles, James F., Rand Avery Supply Company, Boston.
Wightman, George H., The Caney Steel Company.
Watts, Edward T., Philadelphia Electric Equipment Company.

Whitmore, C. F., Whitmore-Dean Manufacturing Company.
 Wood, Chas. N., R. D. Nuttall Company, Boston.
 Washburne, William A., Cambria Iron Company, Philadelphia.
 Wightman, H. J., H. J. Wightman & Co., Scranton, Pa.
 Webb, H. E., Solar Carbon & Manufacturing Company, Pittsburg.
 Wilkinson, E. T., Kensington Electric Company, Philadelphia.
 Wessels, E. J., Standard Air Brake Company, New York.
 Woodbridge, J. Lester, Woodbridge & Turner Engineering Company, New York.
 Wiley, G. L., Standard Underground Cable Company, Chicago.
 Wheeler, Albert, jr., Love Electric Traction Company, New York.
 Wardwell, Fred. S., Wardwell Brothers, Contractors, Danbury.
 Wood, W. C., Brooklyn, N. Y.
 Wylie, W. W., Ottawa.
 Wiley, Jay, Western Electric Company, New York.
 Yates, F. A., The Trendley Brake, St. Louis.
 Yardley, John H., Philadelphia Car Wheel Company.

LADIES PRESENT.

Barnes, Mrs. L. C., Plymouth, Mass.	Johnston, Mrs. W. J., New York.
Bennett, Mrs. J. B., Chicago.	Kelsey, Mrs. T., New Haven.
Breed, Mrs. E. S., New Britain, Conn.	Kimball, Mrs. F. M., New York.
Beach, Mrs. R. H.	Lodge, Miss Mabel, Philadelphia.
Bristol, Mrs. H. A.	Lodge, Mrs. George, Philadelphia.
Brown, Mrs. R., Pittsburg.	McAdoo, Mrs. M. R., Patterson.
Candee, Mrs. W. L., New Haven.	Medbery, Mrs. H. J., Mechanicsville.
Chambers, Mrs. Geo., Long Island City.	Mulhern, Mrs. G. C., Cleveland.
Chapman, Mrs. W. D., Akron, O.	Price, Mrs. C. W., New York.
Connette, Mrs. E. G., Nashville, Tenn.	Richardson, Mrs. C. A., Lowell.
Cunningham, Mrs. J. H., Boston.	Richardson, Miss, Lowell.
Curley, Mrs. Thos. P., Gloucester, N. J.	Robinson, Mrs. J. C., Philadelphia.
Dick, Mrs. H. C., Newark.	Scheffler, Mrs. F. A., New York.
Dimmock, Mrs. W. S., Council Bluffs.	Shaw, Mrs. J. F., Newburyport.
Daggett, Mrs. H. M., Boston.	Silliman, Mrs. F., Scranton, Pa.
Dodge, Mrs. G. A., New Haven.	Simmons, Mrs. E. A.
Eldridge, Mrs. F.	Sylvester, Mrs. J. E., Somerville.
Farwell, Mrs. H. C.	Thompson, Mrs. A. C., St. Louis.
Greene, Mrs. Frank R., Chicago.	Thompson, Miss, St. Louis.
Harrison, Mrs. Russell B., Terre Haute.	Wattles, Mrs. J. F., Boston.
Hogan, Mrs. J. J., Middletown, N. Y.	Wightman, Mrs. G. H.
Johnson, Mrs. A. L., Richmond, Va.	Young, Mrs. A. M., New Britain.

OFFICIAL ENTERTAINMENTS.

Each day had its official entertainment, but with the exception of the banquet on Thursday night, the evenings were set apart for the visitors to amuse themselves according to their own fancy. Tuesday afternoon the officers of the association and members of the executive committee were invited to the city hall, as the guests of Mayor Villeneuve and the corporation of Montreal. A luncheon was served and the association through its representatives, was given the freedom of the city by the mayor and Board of Aldermen.

Wednesday afternoon the testing laboratories of McGill University were visited, where some interesting tests were performed.

On Thursday, A. J. Corriveau took a party around Mount Royal on the line of the Montreal Park and Island Railway. A stop was made at the old snow-shoe club headquarters for refreshments. The cars were handsomely decorated and mounted on Peckham trucks. Another large party rode over the lines of the Montreal Street Railway and visited the power house of the company. In the morning a large delegation visited the Grey Nunnery.

Friday afternoon was devoted to sight seeing and a ride around the city on the cars. Several fender tests amused the spectators.

Saturday morning L. J. Forget, president of the Montreal Street Railway Company, entertained with a breakfast and fox hunt at his country home near St. Anne's. Pres. Hurt won the fox. The larger part of the visitors

enjoyed a trip to Ottawa, as the guests of James Ross, vice president of the Montreal Street Railway Company. The lines of the Ottawa Street Railway were inspected and luncheon was served in one of the public buildings.

CONVENTION NOTES.

W. Worth Bean made a good presiding officer under the most trying conditions the association has ever experienced.

Nearly everybody visited the cathedrals and ascended the mountain. Many took the 8 o'clock morning train up the river and shot the rapids, arriving in Montreal at 10 o'clock.

The speed of ten miles an hour with which the electric cars under heavy load climbed the 10 per cent grade between the Queen's and Windsor hotels, caused much favorable comment.

F. A. Brownell, and Mrs. Brownell, St. Louis, who have missed but few conventions, were detained at home this year by the dangerous illness of their daughter, who was quite low with typhoid fever.

The New York Central generously tendered an interesting side trip free to the 150 eastern delegates on the returning special train. At Saranac, in the Adirondacks, the train made a detour to Lake Placid, where a ride up the mountain was had in 6-horse tallyho coaches.

One of the neatest souvenirs ever shown at conventions was brought by J. H. Carson, president and general



manager of the Sterling Supply Co., New York. It was an elaborate inkstand, handsomely finished and fashioned in the shape of an enormous crab. Mr. Carson's supply was quickly exhausted and he was obliged to take home the names of a large number of his railway friends who will receive one later by express.

The Troy City Railway Company, Troy, N. Y., received 50 cents conscience money. The letter that accompanied it said the writer had been mistreated by a conductor, and to get even had passed a counterfeit half dollar. He did not expect to live long, so wanted a clear conscience.

HARVEY M. LITTELL.

In 1856, at Corydon, Indiana, was born H. M. Littell, who is now deservedly honored with the presidency of the national association. His advance has been steady and rapid, and his prominence has made his name a well known one from ocean to ocean. As a boy he attended the public schools of Louisville, Kentucky, and in 1874



HARVEY M. LITTELL.

began his street railway career as clerk in the office of the Louisville City Railway. He made the rounds of street railway work, including starter, time keeper, track foreman and so on up.

He afterwards entered the steam railroad business with the Louisville and Nashville Railroad Company. He worked himself up in the steam railroad business until he reached the position of General Freight and Passenger Agent of what is known now as the Chicago, St. Paul and Kansas City Railroad Company. In the interim, however, he filled the position of general manager of the St. Paul City Railway Company for a period of three years, from 1883 to 1885, during which time he superintended the reconstruction and extension of the horse railroad system in that city, covering a territory of thirty miles of road. The road then changed hands and he accepted the position of general freight and passenger agent with the Chicago, St. Paul and Kansas City Railroad Company.

In 1888, he left the steam railroad business to take charge of the Cincinnati Inclined Plane Railway, which road was changed from horse to electricity under his administration in the year 1888-89. He remained here until January, 1893, when he was made president of the New Orleans City and Lake Railroad Company and Crescent City Railroad Company, and general manager of the New Orleans Traction Company, at New Orleans, La. These lines embraced about 120 miles of horse railroad, the changing of which to electric lines he superintended, completing the same in June, 1895.

On July 1, 1895, he was made the president and gen-

eral manager of the Atlantic Avenue Railroad Company, of Brooklyn, which position he now holds.

Upon his retirement from the control of the New Orleans roads he was presented by the directors of the company with a solid silver dinner service as a testimony of their appreciation of his "character and ability as a railroad manager in the development of the property."

Mr. Littell is eminently fitted to preside over the deliberations of so important a body as the national association, and his election is a compliment of which both the members and himself may feel justly proud.

THOMAS C. PENINGTON.

The newly elected secretary and treasurer of the American Street Railway Association, Thomas C. Penington, is a street railway man of long experience and wide acquaintance. This election was at once a compliment to the man and the west. Mr. Penington was born in Wilmington, Delaware, September 14, 1844, and resided in the east until 1860 when his parents removed to Wilmington, Illinois. On August 23, 1861, at the age of only 18, he enlisted in the northern army and gallantly remained in constant service all through the war, and until mustered out on July 23, 1865, a term of four years lacking one month. He took part in many engagements and carries with him the marks of battle.

He has been connected with the Chicago City Railway continuously for the past 23 years, and for the last 14 has filled the responsible office of treasurer of the company. He began in an unimportant position as clerk and by his own merit and fidelity to his company was steadily



THOMAS C. PENINGTON.

advanced. During these years he has witnessed the transformation from a few miles operated with bob tail cars, expand to 150 miles operated with electric and cable. Mr. Penington is a quick and accurate worker, and has a faculty of putting into effect most systematic methods without running into red tape. Moreover, he is a great believer in doing things with the utmost promptness and

dispatch. He will serve the association acceptably and intelligently and the very responsible duties could not have fallen into better hands. His constant attendance on conventions during the past 10 years, together with his position and a large amount of travel have yielded him a wide acquaintance among railway and supplymen, with both of whom he is very popular, and he is in position to devote more time to the conduct of his new office than almost any man in the association.

MUST DRAW THE LINE SOMEWHERE.

Two of the ladies who attended the American Street Railway Association Convention were greatly amused at a conversation between two Montreal ladies in a car.

As the car passed the convention hall one lady remarked: "I see there is another convention in town."

"Yes," replied the other, "street car men, I believe."

"These conventions are beginning to be quite common."

"We are not doing anything for them in a social way."

"No. I remember the electric light convention a few years ago, when we had a nice time and opened our houses, but it is different now. We must draw the line somewhere, for it would never do for us to open our houses to conductors and motormen."

"Of course not. But these delegates wear good clothes and seem to be a fine class of gentlemen."

"Yes, that is so. They seem to be able to get a better class of men in those occupations in the States than our company has."

INTERNATIONAL TRAMWAY UNION.

This association, which includes the street car lines of Great Britain and the continent, will hold its next meeting in Stockholm, Sweden. The importance which still pertains to horse car operation in those countries, is evidenced by the following program of the 1896 meeting.

The subjects to be discussed are as follows: 1, The use of barley for horses' food; 2, Food and rations for car horses; 3, The use of turntables to replace sharp curves; 4, The comparative advantages of laying the tracks of country lines and secondary railways on the highways or upon their own land; 5, Union stations and the joint use of tracks; 6, Length of trains on steam tramways and secondary railways; 7, Removal of snow; 8, Track for lines employing mechanical traction; 9, Mechanical motors for street railways and country tramways; 10, Electric power plants and cost of operating such plants; 11, Effect of electric railways upon telegraph and telephone lines, water and gas mains, etc.; 12, Shops and car sheds for electric railways; 13, The comparative advantages of stopping cars at certain points only or at any point desired by a passenger; 14, Speed of street cars; 15, The respective sizes of the body and platforms of street cars; 16, Car fenders.

THE CHICAGO SPECIAL.

The Chicago special made an exceedingly fast trip to Montreal, covering the distance in less than 24 hours, regular schedule being 28 hours. The train ran ahead of the regular trains on the Wabash and Canadian Pacific railroads. The passengers adopted the following:

On Board Special Train, October 14, 1895.

Whereas, the ladies and gentlemen comprising the party by special train from Chicago to the convention of the American Street Railway Association at Montreal, having enjoyed exceptional facilities over the lines of both the Wabash and Canadian Pacific Railways, by having an unusually equipped and well appointed Wagner Vestibuled train placed at their disposal, thus enabling them to reach their destination several hours ahead of the schedule time, and making the trip exceedingly enjoyable and pleasant to all on board, therefore be it

Resolved, that the entire party extend its hearty thanks to the above named railroad companies for their unsurpassed accommodations, and

Resolved, that the party is especially grateful to Mr. F. A. Palmer, assistant general passenger agent of the Wabash Railway, Chicago, for his personal attention in perfecting all arrangements for the trip, and to Mr. D. McNicoll, general passenger and ticket agent of the Canadian Pacific Railway, Montreal, for his co-operation in placing a special train at our service, and also to Mr. N. C. Keeran, city passenger agent, Wabash Railway, Chicago, for his courtesy and untiring energy in looking after the welfare of this party, during the entire journey.

Signed,

A. S. LITTLEFIELD,
GEORGE C. BAILEY,
CHARLES GREEN,
ALONZO W. PAIGE,
JOHN B. BENNETT.

POWER SELLING AT PORTSMOUTH, OHIO.

The Portsmouth Street Railroad & Light Company does an extensive and profitable business in the way of selling power for 500-volt direct current motors. This has been done in the past from the trolley line, but owing to the recent increase of 1 per cent in the insurance rates in all buildings containing this class of circuits, arrangements are being made to put in a separate non-grounded circuit. This service can be given at very low rates and is a good source of profit, because it requires practically no additional attendance at the power station. The charge at Portsmouth is \$5 per month per horse-power for the rated capacity of the motor for 10-hour service six days in the week. This is payable in advance each month. The consumers are charged for the labor and material used in connecting up their motors. The cost of coal is 60 cents per ton. The list of power users is as follows: Three fifteen-horse-power motors operating shoe factories; one fifteen-horse-power motor operating planing mill; one ten-horse-power motor operating planing mill; two five-horse-power motors operating printing offices; one two-horse-power motor operating clothing factory; one one-horse power motor operating coffee grinders, etc., in a retail grocery establishment; numerous fan motors.

The population of Portsmouth is about 17,000 and the stationary power business will probably be largely increased in the future.

EXHIBITS AT CONVENTION

Notwithstanding there were few new devices, the number of exhibits and their arrangement was a pleasant surprise to everybody. It was the general impression that the difficulties surrounding custom arrangements would prevent much of a display, but enough concerns had the temerity to cross the border to fill Victoria rink.

The supply men were loud in their complaints because the street railway men did not inspect the exhibits more. Only a small proportion of the delegates stepped inside the doors, probably because it was known early in the week that the exhibit hall was not heated. The lack of interest, no matter how good the excuse may have seemed, was an act of great injustice to the supply men, who had gone to large expense in getting their wares to the convention, and were compelled in addition to suffer great physical discomfort on account of the cold.

The association has got to do better by the supply men than was done this year, or the whole association will soon die from apathy. There was always a large attendance of citizens of Montreal, which gave the appearance of interest in the exhibit, but these people do not buy goods. The exhibit of the supplies is solely in the interest of the street railway men, and keeps them informed regarding the latest improvements in all branches of their work. If they do not take advantage of the splendid opportunities of inspecting and comparing the products of different manufacturers, these manufacturers are going to stop sending exhibits, for they will discover that one man without an exhibit can see more people than half a dozen tied down to an exhibit, which delegates do not take the trouble to visit.

One thing about the Montreal exhibits is that they were in shape on the opening day. This is the first time on record. On account of the lack of foresight on the part of those who attended to the receiving of goods for the exhibits, there was considerable trouble, annoyance and delay in getting exhibits ready for return shipment, that could have been avoided by the display of a little common sense on the part of the man to whom the goods were consigned. Instead of making out return papers and having them ready, he acted as if the goods were intended to stay in Canada forever, compelling exhibitors to ask for the papers. The result was that many of them had to wait eight hours before they could get fixed to ship their goods on account of the large crowd that was not informed until the last minute of what was required by the government.

Our illustrations, as well as those in the Montreal

souvenir, are from photographs, taken by William Notman & Sons, the leading photographers of Canada, with studio at St. Philips' square, who worked exclusively for the REVIEW. The light was poor and the subjects were difficult to photograph as is proven by the failures of other parties, but comparison with photographs taken by other publications will convince anybody that the REVIEW has secured the finest lot of photographs of the exhibits of the the 14th annual convention of the American Street Railway Association.

The General Electric Company caught the delegates both going and coming. Instead of occupying space in the rink a store was engaged in the Windsor, which everybody was compelled to pass, in going to and from the convention hall. At night, colored light effects in the windows drew attention to the wonders within. This exhibit contained the only novelty at the convention, an electric brake, which was shown in operation on a Peckham truck equipped with two G. E. 800 motors, current being supplied by the Montreal Street



GENERAL ELECTRIC COMPANY EXHIBIT.

Railway. There was an interested crowd of spectators all the time, who marveled at the quick action of the brake. The entire exhibit was well arranged. There were G. E. 800, G. E. 1,200, G. E. 2,000 motors, K-2 controllers and the large form used on the Nantasket Beach road. Dividing the exhibit room from the reception parlor, where the delegates found the usual genial welcome, was a fine example of switchboard work, of General Electric panels for generators and feeders. One of the panels was a sample of the 5,000 ampere generator panels constructed for the West End road, Boston. There were samples of Thomson arc lamps for railway circuits, and a line of overhead appliances. W. J. Clarke's absence was regretted by everybody. The representatives were F. M. Kimball, P. L. Salt-onstall, C. C. Pearce, P. Hodges, Boston; W. B. Potter, L. Dunbar Tandy, A. S. Heywood, Schenectady; R. H. Beach, A. K. Baylor, W. G. Bushnell, Elmer P. Morris, New York; H. J. Crowley, Philadelphia; S. W. Trawick, Atlanta; F. H. Strieby, Cincinnati; F. C.



Todd, Baltimore; T. H. Fearey, Buffalo. G. D. Rosenthal, St. Louis, represented the factory and district offices east of the Mississippi.

The Crane Company, Chicago, had an exceptionally large exhibit of valves for street railway work, tastily arranged by G. A. Hurd, who attended his first street railway convention, and made an excellent impression upon the street railway men, of the excellent quality and high grade of manufacture of the Crane Company's valves. The exhibit consisted of a full line of high pressure goods, gate valves, angles, globes, check, pop and safety valves; cut samples, showing interior construction, with self-packing stem and metallic disk; a line of exhaust valves; fittings for high and low pressure; an indicator stand showing inches and area of valve opening, a device that is of great convenience, and makes a large saving in power plants.

The Consolidated Car Heating Company, Albany, had its new heater especially designed for the Lake Street Elevated Railroad, Chicago, ten of which will be placed in each 46-foot car, the two sides being independent. There was a cross-seat heater, supported from the seat rail, which raises the heater from the floor, so it is easy to sweep under it. The standard heater for side seats was also exhibited, which is flush with the riser, with an air chamber at the back. A new temperature-regulating switch was exhibited, that is really the interlocking of two switches. When unlocked, a spring forces it to the next contact point, so there is no sparking, and the switch regulates the current from a minimum, to half of each heater, and full. The switch locks itself at each point, and cannot be moved until it is unlocked. The company was represented by James F. McElroy, consulting engineer; H. N. Ransom, general eastern agent; W. P. Cosper, general western agent. A trailer connection is placed on the

market, which has no projecting metal to short circuit. Two split plugs are on the cars, with a coupling section of flexible cord.

The Standard Underground Cable Company, Pittsburg, had a line of samples of lead-covered electric cables, and railway feed cables, which were taken from cables representing large sales. Among them was a sample of the 800,000 feet of 750,000 c. m. cable sold to the Philadelphia Traction Company. G. L. Wiley, manager of the New York office, was in charge.

The Falk Manufacturing Company, Milwaukee, showed samples of its cast-welded joint, which has attracted more attention in a short space of time than any joint on the market. E. A. Wurster, secretary of the company, and A. Hoffman were kept busy showing the joint and explaining the process of construction to the interested managers, who are convinced that it is the most solid joint that can be made. Samples of the joint on 6-inch Shanghai rail, being laid down by the Twin City Rapid Transit Company, Minneapolis, as well as sections showing bolt holes, and sections of old rail made as good as new by the use of the cast welded joint, which has from 2½ to 3 inches of metal all around the rail. The managers who have laid down thousands of joints were loud in their praises of the successful operation of the joint on their roads, and expressed the opinion that it was the only practical method of renewing the life of rails which were badly pounded at the joints. Photographs of the processes of welding the joint were placed in conspicuous positions. Several large contracts were closed. An interesting part of the exhibit was the Falk trolley wheel, which has a first-class record.

The McPherson Sand Box Company, Troy, N. Y., represented by Henry McPherson, the inventor, and J. F. Hart, had several samples

of the McPherson sand box. It is cylindrical or drum shaped, holds $\frac{3}{4}$ of a bushel, and has a rotary motion that causes the sand to roll from the top in the same manner as if poured from a pitcher. The spout is so shaped that any obstructions that may come in the sand will not stop the flow. The box is arranged to be operated by either hand or foot power, and agitates the sand at each operation.

The Keller Printing Company, New York, was represented by J. F. Bushe, and Edgar R. Mills. Samples of tickets were shown, also a patent transfer and ticket dater.

The Wakefield Rattan Company, Boston, had several car seats and samples of rattan. One of the cross seats is shown in the illustration of the Consolidated Car-Heating Company exhibit, equipped with an electric heater.

The Massachusetts Car Company, Boston, represented by P. Baumgartner and Arthur Hilton, showed a sample of its work in connection with a steel frame car of the Graham Equipment Company, represented by J. H. Graham.

The Cutter Electric & Manufacturing Company, Philadelphia, had a number of automatic magnetic circuit breakers for switchboard work, a double pole circuit breaker to take the place of fuse block, a new form of switch that is being placed in the new Congressional Library building, and a line of car circuit breakers to be substituted for fuse boxes on cars. Walter E. Harrington, the representative of the company, says the latter will save a large percentage of the present cost of maintaining fuse boxes.

The Scarritt Furniture Company, St. Louis, had its reversible and longitudinal seats, with coverings of rattan, leather and plush. These seats are adapted to all classes of service of street railways and steam roads, and are in use in all parts of the world. S. G. Scarritt, general manager of the company, who was in attendance, said large orders for Scarritt seats had been received from China and England.

Theophile Euphrat, Darien, Conn., had samples of his latest invention consisting of a combination housing harp and trolley wheel and its automatic lubrication. The fork consists of a socket to attach it

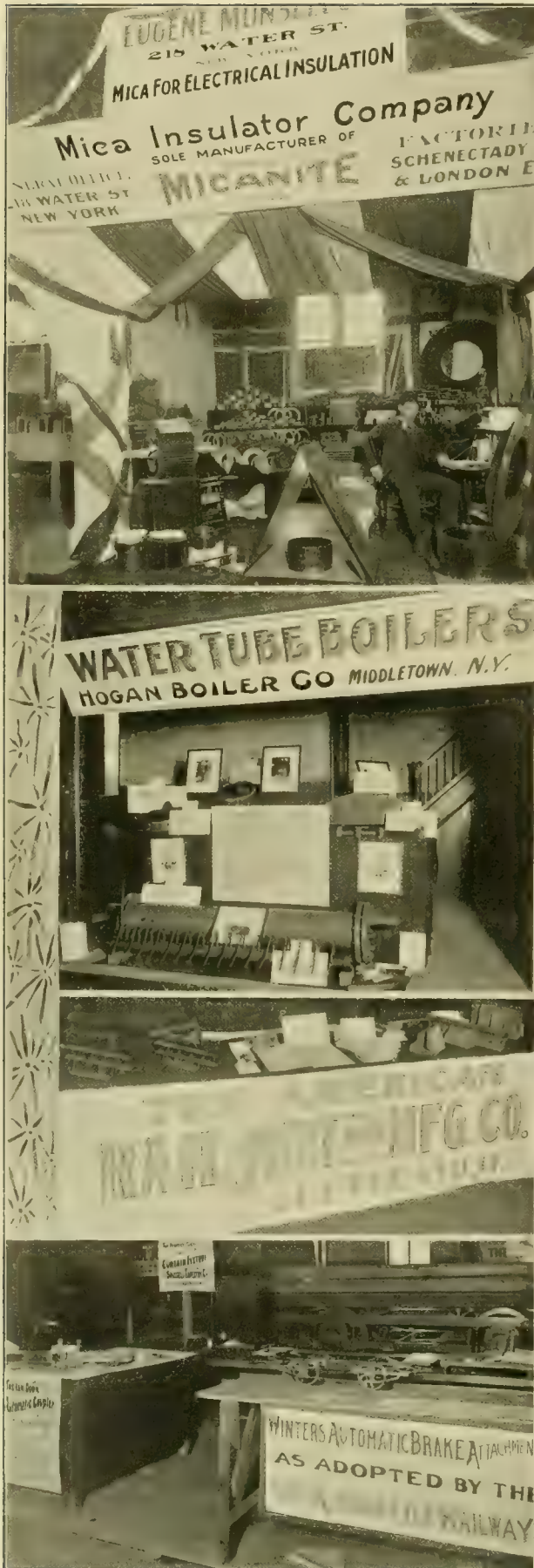
to the upper end of the pole, having a jaw to carry the wheel for guiding the conducting wires into groove, the whole being properly constructed to conduct the current into the fork, to be transmitted to the conductor in the pole. There were samples of the well known ice and sleet cutting trolley wheel. Theophile Euphrat and Charles E. Perry were explaining the devices.

The Taylor Electric Truck Company, Troy, N. Y., went to considerable expense in bringing a large and interesting exhibit of its well known trucks, which have the three points of saving the track, saving the car body and saving the motor. There were two Taylor improved single trucks with compound lever brake and adjustable safe guard; also a set of Empire State radial trucks, one designed to receive two motors, the other one motor, showing the application of brakes. The trucks are so designed that air brakes can be applied, if desired. One improved single truck was shown in service on the Montreal Street Railway under an 18-foot vestibuled car of the Ottawa Car Company, equipped with two 12 A. Westinghouse motors and Ahearn & Soper electric heaters, which was the exhibit of Ahearn & Soper Ottawa. The safe guard on the Taylor truck is a simple contrivance which looks as if it would do all that is claimed for it. Two rods, attached to the truck are bent to resemble a cow catcher, and are covered with canvass. The tendency of the fender is down, and it is impossible to pull it up. A wheel guard passes along the side of the truck just high enough to clear the rail. It can be raised and lowered at will. When in the barn the fender runs under the platform of the car in front. John Taylor, manager, and A. T. Reynolds were in charge. Mr. Taylor sold his exhibit to the Ottawa Street Railway Company, Ottawa, Ont.

Charles A. Schieren & Company, leather belt manufacturers, New York, were not at the convention with samples of leather belting, but were ably represented by Charles A. Schieren, Jr., who distributed a match safe.

The St. Louis Register Company, St. Louis, represented by G. S. Allison, eastern representative, had samples of the standard register with one dial and one totalizer; transfer register with single dial and





two totalizers; vestibule register with two dials showing registration from either end of car. The mechanism is simple and absolute accuracy and the greatest durability are guaranteed.

The best arranged display was that of micanite, by the Mica Insulator Company. There was a micanite plate 42 inches square, micanite cloth, micanite paper, commutator rings for all motors, micanite molded insulation, slot insulation for all types of railway motors, power and light generators, commutator segments and special forms of insulation. In the rear of the exhibit was an illuminated sign showing the trade mark of the company. In the foreground was an optical illusion, consisting of a W. P. 50 railway armature, that apparently weighed 500 or 600 pounds, but insulated with micanite weighed about 20. Near by was a complete commutator insulation showing shell and segments. Eugene Munsell & Co. had in this exhibit a large number of samples of mica cut to size, cut segments of rheostat mica, and mica in the rough. Charles E. Coleman, who was in charge of the exhibit, showed excellent taste in the arrangement of the exhibit.

The Hogan Boiler Company, Middleton, N. Y., had many samples of the product of its plant. There was a feed water inductor by means of which the water enters the boiler through downward circulating tubes in which the temperature is raised to that of the water in the boiler. Precipitation takes place carrying all deposits to the lower drum. The mud drum is connected with the lower distributing drum. The joints of the covers of the mud drum are special high pressure joints. Three examples of manhole covers and joints were shown, which have a copper gasket, and are so constructed that the greater the pressure, the tighter the joint becomes. A steam extractor was exhibited, which separates all the entrained water from the steam, preventing the passage of any water. In addition were samples of cold bent extension sleeves for passing tubes above the water line, and photographs of recent important installations of the Hogan Boiler Company. John J. Hogan and Henry Cole were on hand to explain the merits of the boiler.

The American Rail Joint & Manufacturing Company, Toledo, O., manufacturers of the Bartholomew rail joint, showed samples like those which have been in use for three years on the lines of the Toledo Consolidated, now the Toledo Traction Company, and the Toledo Electric Railway Company. G. D. Clafin, Jr., vice president of the company, who explained the joint, which is on the wedge system and goes entirely under the rail its full length, says there are 8,000 in use in Toledo. He also showed samples of joint on 85-pound rail, used by the Lake Shore Railway and the 70-pound rail of the Illinois Central.

W. T. Van Dorn, manager of the Fitzgerald-Van Dorn Company Chicago, had a sample of the Van Dorn automatic draw-bar, which has been adopted by the Metropolitan L, Chicago, and by many street railways.

D. L. Winters, Chicago, showed a model of the Winters' automatic brake attachment, as adopted by the South Chicago City Railway Company. The brake was described in the October REVIEW.

The Pennsylvania Steel Company, Steelton, Pa., had a sample Harveyized steel frog, and was represented by Mason D. Pratt and John F. Ostrom.

Barrow B. Lyons had a model of the car curtain and samples of curtain goods manufactured by the Brussels Tapestry Company, Chauncey, N. Y. This was shown for the first time and as it is just being put on the market, attracted much attention.

The United States Projectile Company, Brooklyn, showed many samples of its patent hot steel motor pinions and seamless cold drawn steel trolley poles. Charles E. Porter was in charge of the exhibit.

Morris, MacCurdy & Smith, Indianapolis, had a fine display of Phoenix rubber insulating paint. Elmer P. Morris and R. E. T. Pringle had an interesting crowd around them all the time watching their vain efforts to burn paper one side of which was covered with the paint. Mr. Morris said that under tests of the General Electric Company, the Phoenix rubber insulating paint had stood 900 volts after passing through a fire test.

George E. Smith, Sherbrooke, Ont., had a rail bending machine. He said at a recent test, a 70-pound rail was passed through the machine and curved to a radius of 95 feet.

The Chapman Valve Company, Indian Orchard, Mass., was at the rink with a large line of high pressure steam and water valves specially adapted for power house work; special blow-off valves for high pressure boilers; 2 gate valves flanged in and bolted together with renewable seats, so connected that the outside valve can be removed and seats renewed without shutting down the boiler. A line of special brass fittings was also shown. Edward L. Ross, mechanical engineer, was in charge of the company's interests.

The New Haven Car Register Company, New Haven, Conn., had a full line of single, double and triple registers, in nickel, antique copper and bronze, with a full line of rod and cord fixtures and ringing devices for fare registers. Among them was a universal and extension bracket, which has long been needed. By its use roads are enabled to equip different styles of cars with rod fixtures without having a special rod for each pattern of car. The bracket has an arm that moves by means of a ratchet joint, and kept in any position by an adjustable set screw. The registers of the company have been adopted by the New York, New Haven & Hartford Railroad Company, on the Nantasket Beach Division, and by the Philadelphia Traction Company, and in Great Britain, France and Germany. The single register is operated by a rod or cord, the double register by one rod with one set of handles, pulling down, registers one class of fares and pushing up, registers the other. The triple register has the same rod attachment as the double register for two classes of fares and a cord for the third class. The double and triple registers operate on one shaft so at the end of each trip one operation, the same as in the single machine, will turn back all denominations to zero. There is a main registering tram, totalizing tram and trip tram, which will register to 100 and can be reset to 1 each morning. A safety shield covers the main tram, making it impossible to discover the number of the fare until the operation of registering is completed. By pulling a knob the register can be locked. The exhibit of the company was tastily arranged with a profusion of flags and bunting. Each evening the guests of the company and visitors at the rink were entertained by a company of bag-pipers, who gave exhibitions of Scotch dances. The company was represented by F. Coleman Boyd, J. S. Bradley, F. A. Morrell and A. N. Loper.

The Charles Scott Spring Company, Philadelphia, had a large exhibit of samples of every possible spring any street railway man would want. There were elliptic springs for Brill, Bemis, Peckham, and McGuire trucks; coil springs for every truck made; T. H. trolley springs, Nuttall trolley springs, Anderson trolley springs; brush-holder springs for all motors, S. R. G., G. E. 800, Westinghouse; draw springs for all trucks; fender springs, and sash springs. Charles Scott, jr., William H. Hansell, manager of the street railway department, and Harry C. Johnston, eastern agent, received their friends in a bower of potted plants and springs, and distributed pocket-books.

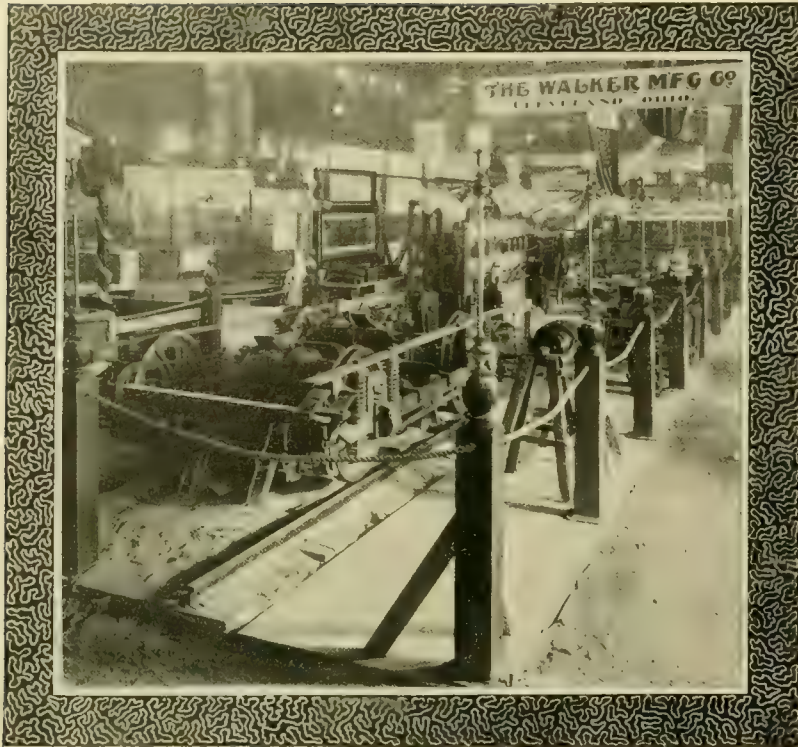
The Forest City Electric Company, Cleveland, showed a full line of roll drop copper commutator bars for all motors and generators. W. B. Cleveland, general manager, and John C. Dolph, eastern agent, did the honors. The fine display of copper was examined by all who entered the rink, and many orders were placed. A small bar suitable for a watch charm was judiciously distributed. A novelty in the shape of a bear reminded visitors to "bear in mind" that roll drop bars were well manufactured and would do all the work demanded of them. W. T. Atkinson has been appointed western agent of the company, with an office in the Monadnock building, Chicago.

J. H. Coleman, Tottenham, Ont., exhibited a farebox that attracted a great deal of attention on account of its novelty to the street railway men from the States. The box in use by the Montreal Street Railway Company afforded much amusement to the visitors, who did not think that a few pieces of shot was much protection to the company, if anyone should tamper with the box. The Coleman fare box is a great improvement on the Montreal Street Railway box. It consists of a flat metal box about two inches wide, 6 inches high and 4 inches deep, having a spring handle which works a drum that conceals the opening, so no money can get out whether the spring is pressed or not. If an attempt is made to withdraw a ticket, it is clutched so tightly by needles that it is torn. Frequent changes of boxes, which can be hung on the conductor by straps if desired, will, the representatives of the company say, assure the railway companies that they are getting all the fares. The box has been patented in the United States, Canada and England, and will be extensively manufactured.



THE NEW HAVEN CAR REGISTER CO
NEW HAVEN, CONN.





The Walker Manufacturing Company, Cleveland, had the only display of motors in Victoria rink. The exhibit consisted of two 25-horse-power motors and two 50-horse-power motors, on Peckham trucks; individual motors, showing different parts in detail; field coils, armatures, showing process of construction, and all the details of manufacturing; controllers, and a switch-board. H. McL. Harding and R. M. Bayliss were the representatives of the company.

D. L. Daniels represented H. B. Camp & Co., Aultman, O., with a line of tile conduits, and the Akron Insulator & Marble Company, Akron, O., with samples of wiring tubes.

The Fulton Truck & Foundry Company, Mansfield, O., represented by W. E. Haycox, president, had models of the imperial standard truck, track cleaner and Troy sand-box. The truck model was equipped with models of the 25-horse-power Card steel motor. Wheels under Fulton imperial trucks have a record of 110,000 miles. Mr. Haycox also exhibited a full-size differential tripod, with pulley for lifting motor armatures out of cars, which attracted so much attention that he booked a large number of orders. The tripod is supplied with a 1,000 or 2,000-pound block and chain, and is sent complete. It can easily be set up inside a car and does its work quickly. James M. Atkinson, of Prather & Atkinson, Monadnock building, Chicago, western representatives of the the company, assisted Mr. Haycox.

George S. Whyte, sales agent Monadnock building, Chicago, had a two-fold exhibit, the Badger Manufacturing Company, Milwaukee, and Chicago Insulated Wire Company, Chicago and Sycamore, Ill. The Badger Company showed a complete line of overhead material, Badger fuse box, trolley base and Hoffman rail bond, and gave away paper weights of miniature trolley bells, an improved form of the W. E. hanger designed to protect the cap holding the insulated stud from the weather and securely locking it. The Chicago Insulated Wire Company had bare and insulated wire from 500,000 c. m. capacity stranded feeder cables, to No. 35 B. S. magnet wire, small spools of which were distributed. Mr. Whyte also gave away a useful linemen's hand book of facts and figures for electric railway construction.

The Lobdell Car Wheel Company showed two wheels with a record of 112,750 and 117,057 miles.

The Robinson Electric Truck & Supply Company, Boston, was represented by William Robinson, general manager.

Edward Grace, vice president of the Portable Hose Bridge Company, Detroit, had a sample of the hose bridge which prevents delays to cars in case of fire. The device has been adopted by a large number of important street railway systems.

Darling Bros., Montreal, Canadian representatives of the Stirling Company boilers, and the Warren Webster & Co., vacuum system of steam heating, showed many photographs of important installations of Stirling boilers. A 150-horse-power heater of Warren Webster & Co. was also exhibited, with samples of the Morse valve reseating machine and Muir's automatic driller. George Darling was on duty.

R. Dittrick, Cleveland, had a fender attached to a Peckham truck in the Walker Manufacturing Company exhibit, and another on a car of the Montreal Street Railway Company. It consisted of a wheel guard fender. C. Dittrick was picked up by the fender every day.

Benedict & Burnham Manufacturing Company, Waterbury, Conn., had a fine display of various sizes of the solid one-piece rail bond and feeder, trolley and magnet wires of pure Lake Superior copper. The bonds were shown as applied to tram of girder rail, allowing constant inspection, a short thick bond applied to base of either girder or T rail, and a solid long bond clearing the fish plate in either girder or T rail. J. H. Woodward, Waterbury, and E. L. Rugg, in charge of the Boston branch, were in charge.

The Meaker Manufacturing Company, North Chicago, Ill., was represented, as usual, with an exhibit by John W. Meaker, who showed a line of portable and stationary Meaker registers, and a new style of trolley hanger and mechanical clip. The Meaker register expresses all amounts in large figures. It is accurate in operation, and easily understood, being built on a correct mechanical principle and carefully constructed. The entire face is protected by one-quarter-inch beveled plate glass. It is impossible to change the direction signal without canceling the fares recorded at the trip window, but the cancelers can only be removed by a return to zero, while the operation does not affect the continuous number. The length of stroke is made sufficient to prevent rapid ringing, so that a red signal is left in view until registration is completed, bell rings, and a complete return is made, making it impossible for the figure to return without registering. A handsomely illustrated catalog was distributed.

The outside exhibits were the Lombard hydraulic brake, Tandem brake, Bonta brake and fender, and Hunter fender.



Although it had no exhibit, the R. D. Nuttall Company, Allegheny, was well represented by F. A. Estep, president; Charles J. Mayer Philadelphia; Charles N. Wood, Boston, and Arthur Partridge, St. Louis. These gentlemen and the goods they handle are so well known that they did not need any exhibit.

The Barbour & Stockwell Company, Cambridgeport, Mass., showed a few samples of small special work castings. Henry R. Luther was in charge.

The J. G. Brill Company, Philadelphia, had a parlor at the Windsor in which were set up models of two maximum trucks, a model of the latest type of pivotal truck, a model of solid forge frame truck, and a single truck. John A. Brill, Samuel M. Curwen, Frank C. Randall, William H. Heulings, jr., George M. Haskell and M. E. Curwen were the representatives of the company.

The Electrical Engineering Company, St. Louis, showed its electric brake on one of the cars of the Montreal Street Railway. S. E. Bruckman, general manager, and Herman Hensler, who represented the company, said the brake only required one-half ampere of current to set it.

The General Incandescent Arc Lamp Company, New York, was represented by Hugh Harrison and R. B. Corey, who reported a great deal of interest in their products.

The Burnham & Duggan Railway Appliance Company, Boston, was not represented by an exhibit, but had plenty of circulars explaining the Duggan adjustable trolley wire bracket with flexible span wire attachment and the Duggan rail chair.

T. W. Shelton, mechanical and electrical engineer for the Southern Electric Railroad Company, St. Louis, was introducing his new rheostat, which consists of fire-clay plates and resistances of strips of sheet-iron placed in the grooves of the plates. The contact plates of the controlling device are on a marble slab.

The Flood & Conklin Company, Newark, N. J., varnish makers, were represented by Franklin Flood and H. C. Dick. Neat stamp boxes and a paper wallet were given to visitors.

The Westinghouse Electric & Manufacturing Company had its headquarters at the Queen's Hotel, but made no exhibit, because it had motors and controllers on the cars of the Montreal Street Railway Company. The representatives of the company circulated themselves and literature among the delegates to good advantage, placing some excellent contracts. The Westinghouse force was George H. Lewars, Albert Schmid, J. H. Rutherford E. N. Sanderson, H. A. Craigin, R. S. Brown, B. F. Stewart, E. F. Gordon, E. H. Heinrichs.

George A. Weber, secretary of the Weber Railway Joint Manufacturing Company, New York, exhibited several samples of the Weber joint for T and girder rail. He claims that the joint permanently maintains surface and alignment, and embodies all the advantages of a tie plate and nut lock with perfect spiking opportunities. A wood filler incased in the channel and shoe angle, being made a trifle too large, is squeezed into position, keeping all parts tight.

George E. Pratt, the genial representative of the Jackson & Sharp Company, Wilmington, Del., was on hand as usual, and assisted E. C. Jackson, the young and successful general manager of the company,

A. D. Simpson, Troy, showed a model of the Simpson & Bigelman's automatic car fender, that runs entirely underneath the car. An apron, striking an object, releases the wheel guard, which drops to the ground.

E. F. DeWitt & Co., Lansingburg, N. Y., was on hand with the DeWitt Common Sense sand box. E. F. DeWitt was pounding sand at a great rate. He said over 100 roads were using his sand box, and every customer who passed by spoke a good word for it. Mr. DeWitt says he isn't afraid to put in stones as large as an inch in

diameter for they can't lock it. He used in showing the box a lot of rubbish taken from a church at the corner of St. Catherine and Windsor streets, that was being torn down.

C. C. Sibley & Co., New York, represented by T. M. R. Meikleham and John H. Barnard, had various supplies, including composite brake shoes, Hazelton boilers, and the Barnard railway telephone signal system, for single and double track lines. It is designed to permit communication between various parts of the system. Telephones are placed where required, and a gong rings continuously when a call is made, until stopped by the removal of the receiver. Each station receives the calls for all stations, but responds only to its own.

The Ohio Brass Company, Mansfield, O., had a pyramid covered with black cloth, on which was placed in an attractive manner a complete line of construction, supply and repair material for electric rail-



ways. The company had the largest display of materials in the rink. There were type K trolley wire hangers, Walker trolley ear, Walker splicing ear, mine insulator, straight underrunning adjustable cross-over, Detroit section insulator, Chapman insulated adjustable cross-over, Buckeye trolley harp, Walker trolley harp and wheel, and Card fuse box. All of these devices have been described in preceding issues of the REVIEW, and have won a large clientage. C. K. King, Charles Traxler and J. F. Macartney represented the company, and distributed a neat match box. A large foreign order was secured.

Oscar L. Whitney, of Cambridge, Mass., had a fender which moved in under the car when in the barn. In addition was a wheel guard with an apron in front, that releases the guard when struck by an object. The wheel guard acts even if the fender is not in place.

The New York Fare Register and Supplies Company, 35 Warren Street, New York, exhibited the Hughes fare register and the Brady wire cutter. All the parts are steel, and the trip hand works with a gear. The totalizer keeps moving, even if the trip hand is thrown out of gear. It is the only register showing 999 on the trip. R. M. Rose and Howard Godfrey were the representatives of the company, which is making arrangements to enter extensively in the supply business.

Charles Yerkes Flanders and H. C. Vansant, represented Morris, Tasker & Co., Philadelphia, who had their exhibit on the lines of the

Montreal Street Railway Company, and whose S. S. S. joint tubular poles are known from the Atlantic to the Pacific. They have also been sold in England and Europe. A glass paper weight with photograph of the works was distributed.

Frank X. Cicott, of the Pettingell-Andrews Company, sales agents for the Billings & Spencer drop forged specialties, was around renewing friends, for there were not enough strangers to convict him of the charge of making new acquaintances.

The Hale & Kilburn Manufacturing Company, Philadelphia, had a sample "walk-over" seat in the Consolidated Car-Heating Company exhibit, also samples of rattan. C. E. Barrett was in charge.

The Standard Paint Company, New York, had a large space and attractive display of street railway specialties, P. & B. armature and field coil varnish, Standard insulating compounds, tape, motor cloth,

did the Sterling wheel guard and pick-up fender. Only one of these fenders is required for a car, as it can be easily changed to the other end, for it is attached to the sills by screws. The wheel guard is so adjusted that it is bound to act, if the fender should happen to miss an object. A full line of overhead material was displayed, and many samples of rattan cut to specified lengths. President J. H. Carson, J. J. Kennelly, superintendent, and G. S. Millen, represented the company.

The E. T. Burrows Company, Portland, Me., had the largest and most attractive display of curtains. There was a model of a closed car window sash, with catches and an automatic curtain which is made in 5 styles; also a new curtain for open cars, which stays where it is put, and will not come out of the grove, nor tilt up. This curtain was shown in a section of an open car. The center of the exhibit space was ornamented by a picture of the works of the company, that rested on an oak easel. On the left was a pyramid of oakette, the water



roofing material for power houses and car barns. F. S. De Ronde, manager, J. C. Shainwald, Chicago, and H. F. Gillespie had a busy time attending to the wants of managers. A Mexican grass card case and memoranda was given away as a reminder that the P. & B. insulating compounds are giving satisfaction wherever used, because they are carefully manufactured of the best ingredients and are free from injurious substances.

The Sterling Supply and Manufacturing Company, New York, had a large and prominent space in which to display its exhibit. The new Sterling register, which will totalize 100,000, was shown both closed and open, so as to show the working. The register is positive in its action, with one trip wheel and one totalizing wheel, the cogs of which mesh. Whenever an attempt is made to manipulate the machine by pulling out the handle the machine is locked and the direction plate falls off line, showing no reading. The company also had a numeral dial register. A sample of the new Sterling brake, illustrated in the October REVIEW, attracted a great deal of attention, as

proof curtain material, and a full line of curtain materials and fixtures was shown. Harry Hoit Russell represented the company.

The Peckham Motor Truck & Wheel Company, New York, had the largest exhibit of trucks, including several that have been in service for a long time on the Montreal Park & Island Railway. In Victoria rink was an attractive display of trucks, consisting of a 7C truck equipped with the Wood & Fowler brake, a standard 6C truck with $\frac{3}{4}$ elliptic springs, showing fender and inside emergency track brake, two aluminum models, quarter size of trucks, one of which was given to McGill University; sections of journal boxes, yokes and samples of the Peckham improved interchangeable wheel. This was the first exhibit of the Wood & Fowler emergency brake, and the track brake. The Wood & Fowler brake can be used in place of the regular brake. It is operated by means of an upright lever, which goes under the car body and is compounded from the other end. The track brake works on a similar principle, but operates on the track instead of on the wheels. In the General Electric Company's ex-

hibit was one extra long extension truck equipped with two G. E. 800 motors and electric brake. In the Walker Manufacturing Company exhibit were two extra long extension trucks, one equipped with two 25-horse-power Walker motors and the other with two 50-horse-power Walker motors. The interests of the Peckham company were looked after by Edgar Peckham, president; Arthur W. Field, eastern representative; W. E. Cooke, general sales agent; C. D. Long, sales agent; W. H. Wilkinson, superintendent. An expensive pocketbook for bills, aluminum paperweights, fac similes of the Peckham interchangeable wheel, and handsome catalogs were distributed.

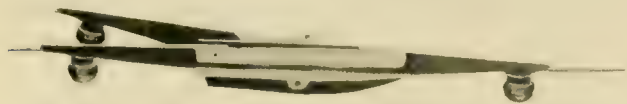
The Consolidated Car Fender Company, Providence, R. I., showed its fender and wheel guard that has been adopted by the Consolidated Traction Company, Newark and Jersey City, which has 365 in use; North Hudson Company, Hoboken, N. J., 41; Union Depot Railroad Company, St. Louis, 282; and samples on many other lines. The fender is constructed of cold rolled round steel with rubber rollers in front. In the center are two wooden cross bars to which is attached a cushion or guard of flat cold rolled steel, covering the draw bar. It projects about 4 inches beyond the bumper when folded against the dash, and is dropped to the track by a pin under control of the motorman. In front of the front wheels is a wheel guard with an apron close enough to assure perfect safety in dropping when anything is struck by the apron. J. W. Range, representative of the company, said persons ranging from 4 to 70 years old had been picked up, and not even a bone had been broken.

The Skeen Electric Switch & Signal Company, St. Louis, had a new crossing signal for electric railways. As the trolley touches a clip some distance from the crossing the contact causes the signal to show. When the car reaches the center of the crossing, the current is shut off from the signal. Robert Skeen and H. O. Rockwell represented the company.

Ahearn & Soper, Ottawa, Ont., had on the tracks of the Montreal Street Railway Company a standard vestibule car manufactured by the Ottawa Car Company, mounted on a Taylor truck, equipped with Westinghouse motors and controllers, and Ahearn & Soper electric heaters. The interior of the car had a unique finish, the seats being springs upholstered, and the floor covered with matting, giving the appearance of comfort.

The Fuel Economizer Company, Matteawan, N. Y., had its exhibit in the power house of the Montreal Street Railway Company, Dominion Cotton Mills, and in the boiler rooms of various concerns in the city. As plants are enlarged in which the Green fuel economizers have been installed, additional orders are placed for this device, which makes a large saving in the cost of fuel. A. H. Blackburn, general manager; William Downs, New York representative; Stanley Green, western representative, Chicago, kept open house at the power house of the Montreal Street Railway Company.

H. J. Wightman & Co., Scranton, Pa., represented by H. J. Wightman, showed a new self-acting spring trolley switch, illustrated herewith. It was designed to prevent delays at switches on account of the



derailment of the trolley wheel. It is light in weight, and does not require span wires to attach it to the trolley wire. A patent mechanical clip is supplied so that no solder is required. It is specially adapted for difficult switches where a high speed frog is needed, and is made both right and left hand. Mr. Wightman also had samples of his improved rail bonds.

The Baltimore Car Wheel Company, Baltimore, was represented by J. Paul Baker, secretary, and by an exhibit of the Whittingham electric heater. The company made no exhibit of its cable and electric motor trucks, flexible suspended car gear, chilled wheels, or the Blackstone automatic fender and wheel guard. The Whittingham electric heater, which has been described in the REVIEW, presents a large radiating surface as the wires are enclosed in cast iron pipes that are attached to the seat riser, the entire length of the car.



W. T. Bonner, Montreal, who is Canadian representative of the Babcock & Wilcox Company, and Goubert Manufacturing Company with works at Belleville, Ont., had several models of feed water heaters and a Stratton steam separator. Frank Thayer, and H. M. Montgomery, of the Goubert Company, were also at the convention.

The Barney & Smith Car Co., Dayton, O., had a model of its new truck, in charge of William Voss, who was kept busy explaining its many excellent points. No small disappointment was occasioned on account of the absence of General Superintendent Kittridge.

L. B. Collins, secretary, had a well-arranged exhibit of the products of the Stever Rail Joint Company, Cleveland. The joint is made in cast steel, or malleable iron for any kind of rail, and has been adopted by a large number of street railways. The illustration shows the joint in position on all varieties of rail.

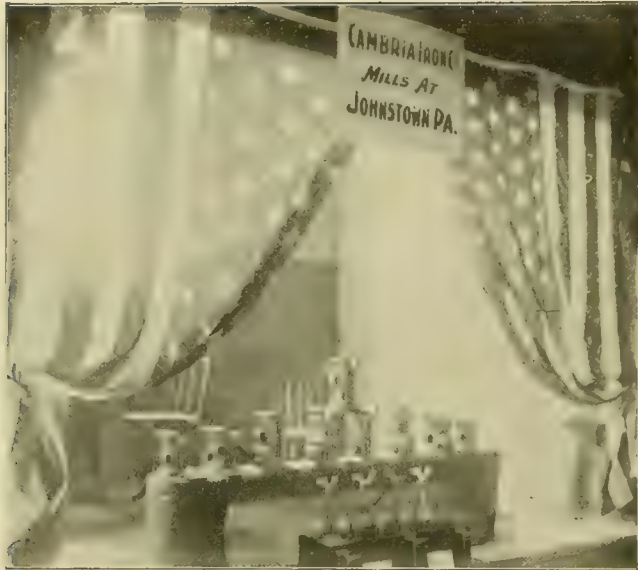
The H. W. Johns' Manufacturing Company, New York, had headquarters in a hotel parlor, and was represented by its most active men. I. W. Perry, of the Philadelphia office; D. A. Brown, manager, and S. E. Estes, Boston office; and Henry G. Issertel, New York did the honors.

There was one lady exhibitor, Mrs. M. Swift, who had a model of the Towne life-saving fender, invented by Edgar Towne, New Brighton L. I., and adopted by the Nassau road, Brooklyn. Mr. Towne and his wife have been picked up 23 times by the fender.

The Roll Slipless Wheel Company, Wilkes-Barre, Pa., exhibited a sample of its new wheel for winter work. The tire is perforated, which enables the weight of the car to force ice and snow on the rim from which it is thrown by centrifugal force. The wheels were on a sweeper of the Wilkes-Barre Traction Company last winter, and crushed through 5 inches of snow and ice. The Chester Steel Company manufactures the wheels. Herman H. Phillips had charge.

The Albert Edwards Car Fender Company, Brooklyn, represented by Albert Edwards, showed a model of the Edwards automatic life-saving car fender, which has been adopted in Philadelphia, Brooklyn, Boston, and 26 other cities. The inventor says, anyone struck by the fender cannot be run over even if lying flat on the ground, but will naturally by concussion be landed clear into the pocket of the fender, which is securely locked by an automatic latch, preventing the person from rolling off onto the track in front of the car. When folded against the dash the fender does not extend beyond the buffer.

The John A. Roebling Sons Company, Trenton, N. J. showed in its space samples of feeder cables and trolley wires. George C. Bailey, western manager, Chicago; M. R. Cockey and W. L. Doyle, from the works, were circulating among the delegates. Paper weights, made of small samples of the 330,000 circular mil pear-shapedrolley wire used on the Nantasket Beach line of the New York, New Haven and Hartford Railroad, and on the Clark street line of the Chicago City Railway, were judiciously distributed.



The Cambria Iron Company, Johnstown, Pa., represented by W. A. Washburne, New York, showed samples of sections 8 to 107 T, girder guard, high T, and groove rails, flush guards, joints, bolts, nuts, etc. The company has had great success in rolling 60-foot lengths.

The McGuire Manufacturing Company, Chicago, had a sample of the Columbia magazine cast iron street car heater, which can be placed in a car without cutting or mutilating the seat. W. J. Cooke, vice-president, and J. H. Hanna, eastern representative, were busy extolling the merits of the stove and the McGuire rotary track cleaner.

The American Railway & Supply Company, New York, showed a line of samples of metal hat and breast badges, buttons and caps for conductors and motormen. Walter Chur represented the company.

The A. Jackson Reynolds Company, Worcester, Mass., exhibited a model of a sweeper which takes up everything it touches, and stores it until it is desired to dump it. There are three brushes run by a union joint. A. Jackson Reynolds, the inventor, told what the sweeper would do.

The Universal Oil Filter Company, Philadelphia, represented by P. N. Brooks, president, showed a new oil filter, pump, reservoir and self-cleaner, which can be adjusted to deliver a drop at a time.

D. C. Sweet, Springfield, Mass., had a bronze sand and salt box, which has a disk-like carrier with five buckets and a spout. Only one pocket is emptied at a punch of the foot lever. Neither nuts nor screws are required.

Alonzo W. Paige, president, and E. S. Nethercut, engineer, represented the Paige Iron Works, Chicago. No exhibit of special work was made, but reproductions of the plans of the terminal of the Metropolitan Electric Elevated Railroad, Chicago, which was constructed by the Paige Iron Works, were distributed at the company's space in Victoria Rink.

The New York Car Wheel Works, represented by the St. Thomas Car Wheel Company, and the Montreal Car Wheel Company, had an attractive exhibit in charge of A. E. Domville, T. J. Drummond and R. J. Murcur.

M. B. Peavey made many friends for Adam Cook & Sons Albany grease. He is the New England agent for the firm, and reports that 7-10 of the street railways in his territory, including the largest roads, use Albany grease on motors, journals, steam engines and shafting.

The Adams & Westlake Company, Chicago, showed the Acme automatic curtain fixtures, samples of curtains and register cord pulleys. L. A. Gray and F. B. Jones explained the exhibit.

The Carter Brake Company, Chicago, had a working model of the Carter semi-automatic brake, and two brakes in service on the Mon-

treteal Street Railway. G. M. Carter, C. W. Carter and P. E. Holt, explained the workings of the brakes.

The E. & M. Traction Company, Philadelphia, was represented by James F. McLaughlin, inventor; George Lodge, general manager, and Andrew Adie, who found many street railway men interested in the new system of car propulsion, which is in operation in Philadelphia. Mr. Lodge was accompanied by Mrs. Lodge and Miss Mabel Lodge.

The Johnson Company was ably represented by Maj. H. C. Evans, A. S. Littlefield, W. W. Kingston, Louis E. Robert, E. B. Entwistle, and E. O. Evans.

E. D. Mier represented the Heine Boiler Company, St. Louis.

D. W. Pugh and John Pugh, veteran convention goers, carried the flag for the Stephenson Company and distributed neat souvenirs.

J. C. Robinson was present in the interests of the Wharton Company, Philadelphia.

Delegates were pleasantly reminded of Laclede cars by E. P. Robinson, of that company.

W. A. Dutton and D. A. Starr did the honors acceptably for the Dorner & Dutton Company, Cleveland.

J. S. Speer, made one more to several jolly parties, who will recall with pleasure him of the Partridge Carbon Company, Sandusky.

A. C. Vosburg, always good company, was welcomed by his many friends, who now carry a neat watch charm, a miniature of the new process rawhide pinions.

Fred S. Wardwell, now of Danbury, Conn., attended this year as a general contractor who has reorganized and put on a money making basis several roads during the past year. In his new role Mr. Wardwell is fully as successful as when a general manager.

P. C. Ackerman and T. E. Donahue of the American Electric Works, Providence, attracted much attention with their new bond.

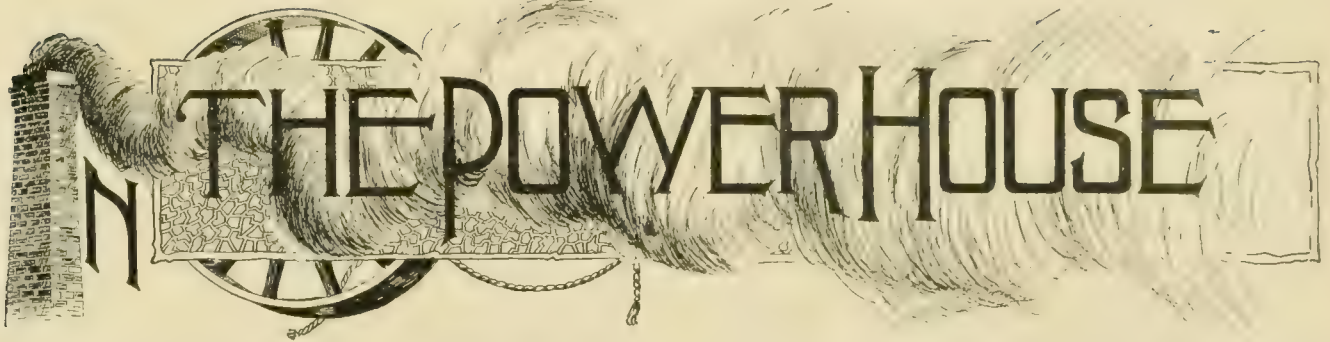
Edward Beadle of the Railway Register Company, New York, was, of course, in attendance, as he has been for years, and right glad every one was to see him.

E. J. Lawless, of the American Car Company, St. Louis, acceptably represented his concern. His only offense was in tipping the engineer at the incline road to let a car load of his friends drop to the bottom in about 12 seconds.

P. F. Leach, may his shadow never grow less, told stories the moral of which were "use Bass Foundry car wheels."

P. M. McLaren, New York, represented the Abendroth & Root boiler, and was everywhere welcome. Mr. McLaren has had long years in the boiler business and is an acknowledged authority on the economical production of steam.

The Okonite Company, Ltd., showed a new method of packing the celebrated Manson tape, which attracted considerable favorable comment. Capt. Willard L. Candee was kept busy explaining that in the future Manson's tape would be sent out in tin boxes about the size of a silver dollar, which would contain about one ounce of tape. This amount will, nine times out of ten, be sufficient for an ordinary repair, and if any is left it can be returned to the box where it will be kept clean and ready for use when wanted. The black tape will be put up in red boxes lettered in black, the white tape in white boxes also lettered in black. Formerly the tape was put in half pound packages, or rolls incased in tin foil, or other wrapping. Linemen would get careless and permit the tape to get dirty, so it was almost unfit for further use, or else throw it away. While these practices were a good thing for the Okonite Company, it was decided that the interests of the thousands of users of Manson tape would be better served by the adoption of the new form of packing. The tape put up in the new form is especially adapted to bicycle tires.



This department is devoted to the construction and operation of electric railway power houses. Correspondence from practical men is specially invited. Both the users and makers of power house appliances, are expected to give their views and experiences on subjects within the range of the department.

There is one electric railway station in England from which American engineers can learn a great lesson. We refer to the Bristol tramways plant in which the regular boiler feeding is done by electric pumps. We advocated this plan many months ago, but no one in this country seems to have pulled out of the rut and adopted the more economical method. This has been left to "conservative" English engineers. The economy of the electric pump over the direct acting steam pump cannot be denied. The direct acting steam pump commonly used for boiler feeding makes no use of the expansive force of the steam and cannot help being a wasteful piece of machinery. Power recently instituted a set of inquiries as to the steam consumption of such pumps per indicated horse-power-hour. The answers varied widely, but the average was in the neighborhood of 100 pounds per horse-power-hour. Now, an electrical horse-power-hour at the station switchboard, takes only from 20 to 35 pounds of steam and the pump motor would have an efficiency of at least 80 per cent, so there is no doubt about the chance for saving by using electric pumps. A rotary steam pump, such as is used for pumping large quantities of water in waterworks and which makes uses of the steam expansion, would probably be as efficient as the electric pump, but small pumps of this type require very heavy fly wheels in proportion to their size and are liable not to be as satisfactory in operation as the electric pump which has no dead centers, and requires a minimum of attention. Moreover the speed of the electric pump can be given a considerable range of variation without impairing its efficiency. Even the best cared for direct acting steam pump loses considerable by steam leakage, past pistons and valves when run at the very slow speeds customarily employed when feeding boilers. The electric pump can only run when a plant is in operation, but that is the only time that much feed water has to be pumped. A steam pump could be kept in reserve, and the arrangement would then be a steam pump and an electric pump instead of duplicate steam pumps as is now customary. The Bristol station

has two electric pumps, thereby economically providing for varying loads.

* * *

The following is a continuation of the reports begun in the power house department of our October issue on electric railway power plant performance.

No. 9.—Syracuse & East Side Railway Company. Daily output at switchboard about 1,323 electrical horse-power-hours per day. Station operated 18 hours. Equipment—two horizontal return flue boilers fired by hand; one 3½x14 foot, E. H. Jones & Co., feed water heater; two 16x42 inch, Allis corliss simple non-condensing engines direct belted. Run of mine soft coal costs \$2.65 at the power house. Results:

Fuel consumption per electrical horse-power-hour.....	3.59 pounds
Cost of fuel per electrical horse-power-hour.....	\$.005
Cost of station labor per electrical horse-power-hour....	\$.006
Cost of oil and waste per electrical horse-power-hour....	\$.0003
Total cost of power per electrical horse-power-hour....	\$.0113
Cost of motive power per motor car mile.....	\$.015

No. 10.—Ogden City Street Railway Company. Daily output about 2,560 electrical horse-power-hours in a run of 16 hours. Equipment three return flue boilers, 64 inches by 20 feet, with 70 four-inch tubes of ½-inch steel, fired by hand. One 16x28x48 cross compound condensing corliss connected by rope drive to line shaft. Bituminous slack costing \$2.40 per ton is used. Results:

Fuel consumption per electrical horse-power-hour.....	3.06 pounds
Cost of fuel per electrical horse-power-hour.....	\$.004
Water evaporated per electrical horse-power-hour.....	20.65 pounds
Water evaporated per pound of coal.....	6.75 pounds

No. 11.—Chester, (Pa.) Traction Company. Daily output 7,700 electrical horse-power-hours per day; readings taken hourly; station operated 20 hours. Equipment: eight 5 by 18 horizontal return flue boilers; heavy hand firing on alternate sides of the grate, no slicing of fires; one live steam and three exhaust heaters; four simple condensing corliss engines, two direct belted and two with jack shaft; one compound condensing engine direct connected (the saving due to compounding and direct connection in this plant has been found to be 21.8 per cent.) The fuel is Lykins Valley pea coal having 13 per cent ash, and costing \$2.60 per ton at the power house. Results:

Fuel consumption per electrical horse-power-hour.....	2.62 pounds.
Cost of fuel per electrical horse-power-hour.....	\$.0032
Cost station labor per electrical horse-power-hour....	\$.00148
Cost oil and waste per electrical horse-power-hour....	\$.00032
Total cost power per electrical horse-power-hour.....	\$.005
Cost of motive power per motor car mile.....	\$.0086

No. 12.—Daily output 7,100 electrical horse-power-hours. Readings taken at switchboards every 15 minutes. Station operated 20 hours for running cars and 4 for lighting plant. Equipment: three 300-horse-power Stirling water tube boilers; oil fuel; three 300-horse-power Green fuel economizers in stack; three simple condensing 22x48 Allis corliss engines, 300 horse-power each, direct belted. Oil fuel costs \$.0154 per gallon. Results:

Fuel consumption per electrical horse-power-hour.....	$\frac{3}{16}$ gal. oil
Cost of fuel per electrical horse-power-hour.....	\$.0046
Water evaporated per electrical horse-power-hour.....	27 pounds
Cost station labor per electrical horse-power-hour.....	\$.002
Interest on cost of station per day.....	\$.20.60
Interest on station per electrical horse-power-hour.....	\$.0028
Cost of oil and waste per electrical horse-power-hour....	\$.0002
Total cost of power (exclusive of such fixed charges as insurance, etc.,) per electrical horse-power-hour....	\$.009
Cost of motive power per motor car mile.....	\$.0165

No. 13.—Metropolitan Railroad, Washington, D. C., power house operating the Ninth street underground conduit line. Daily output 3,444 electrical horse-power-hours per day, kept by watt meter. Plant operated 20½ hours a day. Equipment: three 250-horse-power water tube boilers, fired by hand; three 400-horse-power Goubert exhaust heaters and one 500-horse-power exhaust heater in exhaust of condensers, feed water pumps, electric light engines and artesian well pump; three slow speed compound condensing Green engines, 17½ by 32 by 48 inch, direct connected to 300 kilowatt General Electric generators. The fuel is Georges Creek Cumberland coal costing \$2.69 per long ton. In these results no deduction is made for the steam consumed by an artesian well pump (a very uneconomical form of engine) working 24 hours a day and a high speed electric light plant running all night. Results:

Fuel consumption per electrical horse-power-hour.....	3.66 pounds
Cost of fuel per electrical horse-power-hour.....	\$.00439
Cost station labor per electrical horse-power-hour.....	\$.00428
Interest on cost station per day.....	\$.18.00
Interest per electrical horse-power-hour.....	\$.005
Cost oil and waste per electrical horse-power-hour.....	\$.00043
Total cost per electrical horse-power-hour (including repairs and not including interest).....	\$.00946
Cost motive power excluding interest per train mile (motor and trailer total weight 21,250 pounds).....	\$.01205

OLD TRAM RAILS AS UNDERGROUND FEEDERS.

A very satisfactory method of utilizing worn out tram rails has been adopted by the Buffalo Railway Company which is using them as underground feeders. The old rails weigh about 50 pounds to the yard and are connected with the Edison-Brown plastic rail bond. One conduit 1,500 feet long is composed of four lines of rails in parallel. With a current of 1,100 amperes, the drop is but four volts. This remarkable performance proves that the plastic bond actually gives an electrically continuous rail. Another conduit 1,800 feet long and composed of 14 lengths of these rails in parallel is now being installed under the supervision of Harold P. Brown

whose system of electrolysis prevention has been adopted at Buffalo, and elsewhere.

A BIG CABLE.

The Washburn & Moen Company, recently had a big load to handle in San Francisco, and our illustration shows how it was accomplished. The rope was 31,000 feet in length, of 1¼ inches diameter and was delivered



MOVING A BIG CABLE.

to the Fulton street cable line of the Market Street company, San Francisco. The weight of the cable, reel and truck was 130,000 pounds and required 56 horses to draw the load.

We are indebted to Frank L. Brown, Pacific coast agent, for the photograph.

STREET RAILWAY MEN FROM IRELAND.

Four distinguished representatives of the Dublin Tramways Company have been traveling in this country inspecting methods of construction and operation of electric roads. They are interested in the conversion of a horse line to an electric, which has been described in the REVIEW, and felt as if they wanted to see for themselves the actual development of electric railway systems as shown in this country. John Wigham, Hon. William Murphy, M. P., Dr. William Carte and William Anderson, secretary and manager of the Tramway Company, were of the party. They were interested listeners at the sessions of the American Street Railway Association.

PLANS FOR ALLEY L.

The Alley L, Chicago, now in receiver's hands, contemplates the construction of some crosstown feeder lines, to be electric and run on the surface. Estimated cost is \$300,000; estimated earnings \$365,000. The plan is to run the surface cars on incline at the elevated portion of the line and transfer passengers to present platforms. The plan is a good one and seems the only hope of immediate relief, as the districts it is proposed to tap would furnish a large business.

TIES AND POLES.

Paper Read Before The American Street Railway Association, Montreal October 17, 1895.

BY N. W. L. BROWN, ATLANTA, GA.

In 1890 the Fulton County Railroad Company (Georgia) built several miles of track in Atlanta, in which 40-pound and 45-pound rails were used. In suburban and unpaved tracks the rails were spiked directly to pine ties. In paved tracks they were supported on 4-inch chairs. This paving was of Belgian blocks, supported simply on 3 inches of sand and provided with a sand filling, and the ballast for the track would seem to have been about three inches of sand. These tracks are now owned and operated by the Atlanta Consolidated Street Railway Company, and it was fully two years ago that we were forced to make a few renewals of ties under them.

About one year ago the ties under the suburban tracks had to be almost entirely renewed, and the paved tracks began to develop serious defects from rotten ties. We considered the short life of these ties due to the use of inferior timber, and hence did not give the situation any serious consideration, but recently we have seen tracks going to pieces from rotten timber, which were built in 1891, and known to have been built of first-class pine; and a thorough examination has shown conclusively that six years is the longest life we may expect of select pine.

In tearing out horse car and dummy tracks we have frequently found oak ties of which accurate records could be had, and from these we are led to believe that eight years is the longest life we may expect of oak. These lives, which correspond closely with those met with in railroad experience here, and in many sections of the north, have caused us great disappointment, since we had expected the location of our ties beneath paved streets to have had a great preservative effect upon them, in accordance with the experience reported by many street railway engineers.

As timber will not decay when frozen or constantly submerged in water, and as certain ingredients in different soils tend to hasten, while others tend to retard decay, it may be that our experience in an equable climate, in a well drained city, and upon the red clays of Georgia, differs widely from those met in some sections, still we cannot help thinking our conditions ought not to differ greatly from those met with generally. In railroad experience, ties covered up, and poorly drained, decay more rapidly than those in ballasted and well drained track, and remembering that street railway ties are poorly drained at best, and that they are, even with the best paving, liable to be wetted by every rain, and to be constantly shifting their state of dampness, and remembering too that the ties and rails vibrate even in the most solid construction, and hence are in contact with the air, we cannot see why street railway ties should ordinarily last longer than buried railroad ties. We have gone quite thoroughly into the question of the advisability and economy of using ties of greater first cost and longer life.

We have conferred with many street railway engineers and find positively no uniformity of opinion or practice as to the best tie to use. One engineer prefers and uses oak, another tamarack, another chestnut, another cedar, another cypress, another Georgia pine, and very few engineers claim to have solved the problem of ultimately the most economical track construction by adopting metal ties.

It seems to be generally conceded that metal ties require for their proper foundation a thorough bedding in concrete, and if it is granted (as claimed by a few American and many English and Continental engineers) that a concrete foundation is necessary in any good track, then the selection of metal ties may bespeak good judgment in deep rail construction; but most American engineers claim that concrete is not necessary in first-class track construction, and if this opinion (in which we heartily concur) is correct, then there can be few cases, if any, where metal ties would be most satisfactory and economical.

In New Orleans excellent results have been obtained under horse car tracks with red cypress, which is reported to have been in good condition after 28 years of service. Red cypress and especially black cypress are among our most durable woods, but their extreme softness and inability to properly hold spikes have been a serious hindrance to their extensive adoption for railroad ties. The extraordinary results reported in New Orleans are doubtless due to the light requirements of horse car service, and the fact that these ties are always in very damp, marshy earth, if not actually submerged in water.

We have conferred with many members of the American Society of Civil Engineers connected with railroads in the south and west, and we find among them a great diversity of opinion as to the merits and life of cypress timber, both for trestles and ties. This is evidently due to the fact that cypress, like other timbers, lasts better under certain circumstances than under others, and apparently to the fact also that considerable confusion seems to exist as to the proper classification of the different grades of this timber, white cypress being worthless, and red cypress itself (which is perhaps most extensively used) being a little inferior to black cypress.

It is claimed that even the most expert inspectors can seldom distinguish one variety from another of this timber, and that cypress dealers often classify the product of one tree as belonging to the three varieties. Reports of the life of black cypress in trestles vary from eight to 20 years, averaging perhaps from twelve to fourteen years, while its life in railroad ties is variously reported between seven and 12 years, the average corresponding closely with that generally assumed nine years.

A prominent timber expert of our city estimates that black cypress in our tracks ought to last about 10 years,

and the information before us leads us to believe that this estimate must be about correct.

After consulting all the few reports and treatises available upon the subject of timber preservation, we have conferred again with many members of the American Society of Civil Engineers and other experts, and our opinion seems to be universally endorsed that efficiently creosoted ties are ultimately the most economical for use in street railway work.

At present we omit the vulcanizing process, which has in a few cases given good results, but whose merits are still in a measure in question. We can say that the preservation of timber in quantity is confined almost exclusively to two standards, and long established processes, viz., burnettizing and creosoting. Burnettizing, or the treatment with zinc chloride, is the process, (modified by patents in some cases) most extensively used in America for the preservation of railroad ties, mainly on account of its least cost, its resistance to being burnt, and on account also of its being simpler or safer than the treatments by the injections of other metallic salts.

Burnettizing is extensively used in the west, and it has given good results, especially in dry localities, but there are many conditions met with in street railway construction which are unfavorable to its success.

1st. Zinc chloride is a salt, easily washed out when exposed in wet localities.

2nd. Leakage currents from the rails might hasten its disappearance.

3rd. It has a tendency to rust the rails and spikes.

The creosoting process was invented and established in 1838 by John Bethell, of England, and for many years past it has been almost universally used in England and France for the preservation of ties and telegraph poles.

The average life of creosoted beech ties on the Northern Railway of France is 27 years. Properly creosoted spruce ties in England last from 16 to 20 years. It is reported that the mile of track laid of different kinds of creosoted ties on the M. N. O. & T. R. R. near West Pascagoula, Miss., in 1869, showed when examined in 1886 that seven of these ties had been removed, one from rot, and six from being cut into by the rail.

Trestles built on the H. & T. C. R. R. 22 years ago were recently reported in good condition.

Many cases have been reported in this country where creosoted timber was sound after 16 years of service.

Creosoted timber is in many respects peculiarly suited for street railway ties.

Creosote cannot be washed out, and being a perfect insulator, is beyond the reach of the electrolytic action of leakage currents.

It might have an important bearing (especially in stringer tracks) on reducing the leakage from the rails to the water mains, etc., its tendency is to prevent iron and steel from rusting.

For a long time 6 inch by 8 inch by 7 feet were our standard dimensions for ties, but over a year ago we

changed these to 5 inch by 9 inch by 7 feet and consider our present standard more satisfactory.

In railroad practice where tremendous loads are carried upon low rails it has been found that too broad a tie would rock itself out of a proper foundation in ballasted track, and it is on this account that broad ties are objectionable in ballasted railroad work, 6 inch by 8 inch by 8 feet being the adopted standard.

In street railway work, however, where deep rails are used and where this "rocking" amounts to nothing, we think a broad tie has many advantages over the narrow ones sometimes used. We have recently used 3000 sap pine ties from the Fernandina Oil & Creosote Works, and are expecting good results from them. These ties, treated with 12 pounds of dead oil of coal tar (creosote) per cubic foot, can be delivered f. o. b. cars Atlanta, for 60 cents each. First class pine ties now cost us 26¼ cents each, oak in quantity 30 cents each and black cypress about 40 cents each.

We know that under our present scale of wages, the labor of tearing up and renewing track paved with ordinary Belgian blocks with a sand foundation and filling will cost about 36 cents per lineal foot of single track, and hence we can readily make a comparison for determining the most economical tie to use.

From the information before us, we feel sure that we can safely assume 24 years as the life of a creosoted tie, and with this assumption we will determine the cost of keeping the different kinds of ties under sections of track for 24 years.

Assuming the ties to be spaced 2 feet 6 inches apart center to center, creosoted ties will cost 24 cents per lineal foot of track, therefore 60 cents (36+24) will represent the cost of labor and ties per lineal foot in rebuilding. Principal and interest on 60 cents at 6 per cent for 24 years, \$1.46, which is the actual cost per lineal foot of keeping ties under this track for 24 years.

Cypress ties will cost 16 cents, (36+16) will represent the cost of labor and ties per lineal foot in rebuilding where they are used. With a life of 12 years, which is generally assumed as the maximum in railroad practice, two renewals would be required in 24 years, therefore, for the first renewal,

Principal and interest 52c. at 6 per cent for 24 years.....	\$1.27
And for the second renewal, principal and interest 52c. at 6	
per cent for 12 years.....	.89

Total.....\$2.16

Oak ties will cost 12 cents per lineal foot, and 48 cents (36+12) will represent the cost of labor and ties in rebuilding, where they are used.

With a life of eight years three renewals would be required in 24 years, therefore for the first renewal,

Principal and interest 48c. at 6 per cent 24 years.....	\$1.17
For second renewal, principal and interest 48c. at 6 per cent	
for 16 years.....	.94
For the third renewal, principal and interest 48c at 6 per cent	
for 8 years.....	.71

Total.....\$2.82

Pine ties will cost 10½ cents per lineal foot, and 46½

cents ($36 + 10\frac{1}{2}$) will represent the cost of labor and ties in rebuilding, where these are used.

With a life of six years four renewals would be required in 24 years, therefore for the first renewal,

Principal and interest $40\frac{1}{2}\%$ at 6 per cent for 24 years.....	\$0.988
For the second renewal, principal and interest $40\frac{1}{2}\%$ at 6 per cent for 18 years.....	0.842
For the third renewal, principal and interest $40\frac{1}{2}\%$ at 6 per cent for 12 years.....	0.696
For the fourth renewal, principal and interest $40\frac{1}{2}\%$ at 6 per cent for 6 years.....	0.551

Total.....\$3.077

From these comparisons we see that with the lives assumed, cypress will cost 48 per cent more than creosoted timber. Oak will cost 92 per cent more than creosoted timber. Pine will cost 111 per cent more than creosoted timber.

These comparisons assume that the service of the different ties during their lives is equally satisfactory, which is practically correct in the case of oak, pine and creosoted pine, but cypress, on account of its softness, gives inferior service.

These figures take no account of the disturbance to travel and to residents along the street while renewals are going on, nor do they consider that repairs are necessary long before complete renewal, and that these repairs would be much less where the track was going to pieces once than where it was going to pieces several times in a given time.

We have assumed in this comparison contract prices on creosoted ties delivered here by rail from a point many hundred miles distant, while we believe that street railway companies can creosote their own timber at much less cost generally than they can expect to have it done by contract. These creosoting establishments are generally extensive affairs, and while they may be kept busy for months at a time we think it is a fact that their interest on investment, salaries for expert superintendence, sales department, labor, etc., are much more regular items at least than their orders.

We feel that it would be economy for any street railway company operating extensive mileage, and affected like ourselves with short lived ties, to install a small creosoting plant on the power house premises, which are generally large, and supply this plant with steam from the main boiler plant and with power for pumps, etc., by means of electric motors. In this way expert superintendence could be given by the chief engineer, the plant could be operated most economically, and when idle the interest on the cost would be about the only expense connected with it.

A porous wood is necessary for proper treatment, and while beech, on account of its great toughness, seems to give better results than almost anything, spruce and sap pine are standard articles for treatment. In many localities, especially in the south, this sap pine timber which is in little demand ordinarily, can be had at a very low price, and with a plant installed and operated in the manner outlined above, we feel sure that these ties could be pur-

chased and treated at a total cost not exceeding 40 cents each.

We estimate that a plant, consisting of a treating cylinder, 6 feet in diameter and 36 feet long, with a capacity of about 300 ties a day, should not cost more than \$6,000, complete with necessary cars, pumps, tanks, super-heating apparatus, etc., necessary for operating it. Not only would such a plant be of service for ties, but also for treating floor timbers for cars, trestle and bridge timbers perhaps, and especially for treating cross arms and poles for line construction.

Red cedar poles have been almost universally used in our overhead construction, although iron poles set in concrete have been used in the heart of the city, and cypress poles have been used in a few cases when we could not secure cedar promptly.

The specifications by which most of our cedar poles were purchased required 28 feet in length and a minimum top diameter of 6 inches. but these poles proved too small and in many cases too short, especially where guard wires are required.

These red cedar poles for this market are generally obtained in east Tennessee, although the timber exists more or less bountifully in many sections of the south. It has been used almost exclusively by the Western Union Telegraph Company which estimates that these poles last on an average about 15 years. The sap generally decays in five or six years, and in many cases it has been found that the heart decays in 12 years while again in many cases it will last 20 years.

Cedar poles, especially when used according to the ordinary custom, have many defects in street railway service.

1st. Their life is practically limited to the life of their sap, as when this decays the heart left is too small and weak for reliable service.

2nd. Larger poles are liable to be very defective, generally being hollow at the butt, and frequently containing rotten knots.

3rd. Cedar is very brittle and treacherous under tension.

4th. Large, short poles are excessively expensive, as they are equivalent on the market to long poles cut off.

We are now estimating that our cedar poles with large hearts will last 12 years. The cedar poles we have used appear to have cost us about \$4 each, erected.

Our iron poles which have cost about \$18.00 each erected, do not appear to be lasting as well as was hoped. They have too great a tendency to rust near the ground, and we doubt whether they can be safely depended upon for more than 15 years.

We believe properly creosoted pine poles, 30 feet long and 8 inches at the top ordinarily, and 10 to 12 inches at the top where special demands are made upon them, should be equal in point to excellent service, and superior in point of long service to any poles on the market. These poles, treated by contract to 10 pounds of creosote per cubic foot, should not cost more than \$5 each erected, and when treated in one's own plant, this price could doubtless be reduced to \$3.50. Pine in its growth is

one of the most perfect and symmetrical of all timbers, besides having a tensile strength about twice as great as cedar. Creosoting is generally conceded to increase the strength, and all these properties would seem to indicate that the creosoted pine pole should be strong enough for city work, but it is the long life that makes this pole specially suited for street railway work.

W. H. Preece, the celebrated English telegraph engineer, reported in 1884, as a result of 30 years of experience, that he had never seen one single properly treated telegraph pole which showed the least decay, and he referred to 318 poles, which after 35 years service were torn down to make way for larger poles, every one of which showed after this service no signs of decay. Creosoted poles are universally used in English telegraph work.

The district superintendent of the Western Union Telegraph Company, here (Atlanta) tells us that he was recently asked to examine a lot of creosoted poles, supplied to his company for experiment, by the works at West Pascagoula, Miss., 12 to 15 years ago perhaps (as well as he remembers) and that he found every one in perfect condition. He dug down to the bottom of many and could find no signs of decay.

Creosoted poles installed near St. Augustine, Fla., in 1888 have within the past few days been examined fully and are reported by the superintendent there of the Western Union Telegraph Company to show as yet no trace of decay. Creosoted poles have a great advantage in being perfect insulators, over iron poles, which are grounded conductors, and liable to cause accidents to the lines and linemen.

If creosoted poles are superior to cedar in almost every respect, the question naturally arises, why are they not adopted by the Western Union Telegraph Company? This question is easily answered. Most of the poles of this company are along the railroads and insecurely protected against fire. A creosoted pole is very inflammable and the company is afraid this one great disadvantage in its work would more than offset its advantages.

Much has recently been done toward developing to perfection the national standards in street railway engineering practice, but we feel that these standards in track and line construction would be as a rule improved by the use of creosoted timber.

TICKET COUNTERFEITING IN CHICAGO.

The Chicago City Railway, last month unearthed its first case of ticket counterfeiting. Robert Mather a cable car conductor and his brother-in-law, Earl Hollis, an engraver, had been printing city employe's tickets and turning them in, in place of cash fares. The tickets of this class are redeemed by the city at 4 cents apiece. It was known for some time before the capture that there were too many of these tickets, and that something was wrong. The men when caught were trying to burn a lot of tickets they had printed. They are bound over to the grand jury for November.

THE SKEEN CROSSING SIGNALS AND TROLLEY CATCHER.

A device for taking the place of a watchman at crossings and branch-off corners, which has found some use in St. Louis, is illustrated herewith. It is made by the

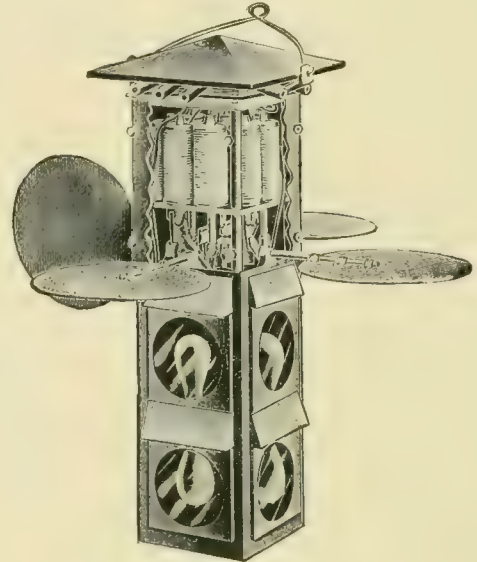


FIG. 1.

Skeen Electric Switch and Signal Company. Fig. 1 shows a semaphore for crossings which shows when a car is approaching the crossing and indicates from which direction. It is operated by current from the trolley.



FIG. 2.

On the trolley wire at each of the four approaches is fastened a trolley contact, shown in Fig. 2. It is a light device and needs no span wires to keep it upright. The flexible copper strips with which the trolley wheel flanges

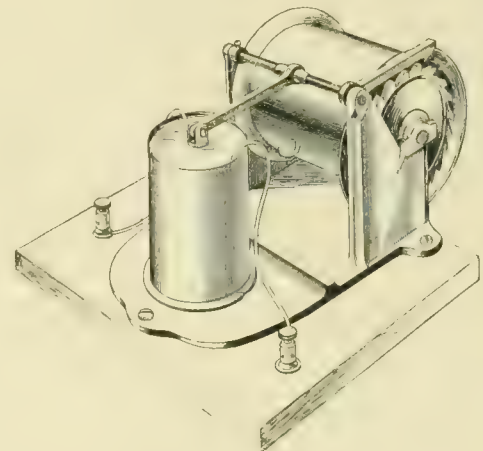


FIG. 3.

make contact are short enough so that they can not touch the wire and make accidental contact should they become bent in. The Skeen trolley holder is another appliance made by the same company. When the trolley breaks contact with the wire the rope is automatically caught and the pole can not fly up.

RAILWAYS AS INFRINGERS OF PATENTED ARTICLES.

In view of the attention given patent matters at the recent Montreal convention, the following from the Railway Master Mechanic, throws some light on the effect of the patent associations in the steam road field. It says:

The announcement that the Siemens-Halske Electric Company of America has brought suit against the Metropolitan West Side Elevated Railway Company of Chicago, to restrain it from infringing their patents covering the third rail and contact system of propelling electric cars, will probably create more or less envy in the breasts of the manufacturers of railway supplies for the steam roads of this country. For it is a fact that as matters now stand these manufacturers do not dare to sue steam railroads, even if the infringement is of the most flagrant character. This is a strong statement, but unfortunately it is true, and it goes without saying that a great injustice is thereby being done to manufacturing interests.

The steam railroads of this country have organized what is known as the Eastern and Western Railway Association, one of whose duties it is to furnish to the roads that are members, opinions on patents covering articles that are offered to them for purchase. This is an important duty, and was undertaken to protect railroads from damages incurred from ignorantly or thoughtlessly using patented articles that were infringements. It is a wise provision and rightly carried out should be satisfactory to all concerned, as it acts to protect alike the rights of the manufacturer and the purchaser. But it soon came to be understood that he who sued a member of one of these associations would incur the displeasure of the other members and might find it difficult to do any business with them. This has been held to be a reasonable restriction to place upon sellers of railway supplies and it is conceivable that if every one was perfectly fair in such matters no harm would be done. Unfortunately, the implied rule has operated to make some roads careless, and it is charged that others have deliberately taken advantage of it. They feel that they will not be sued in any event, and they therefore are disposed to use any device that meets their fancy, leaving the manufacturers to fight it out among themselves. The firm whose patents are infringed thus sees railroads patronizing concerns making articles which expert opinions from the railroad's or association's attorney would pronounce infringements.

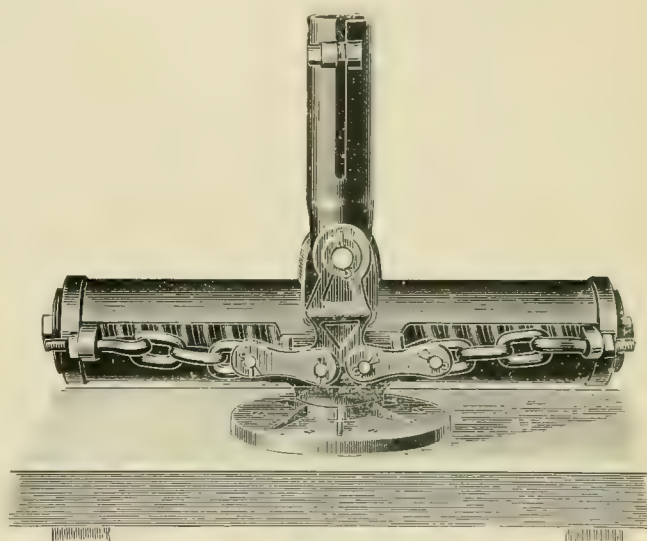
And what course can such a firm pursue? It dare not sue the railroad, for if it does, it antagonizes other railroads not already involved, and its business may suffer thereby. If it sues the manufacturer, the railroad goes on buying from the latter under promise of protection from damages, and from the profits of such sales the infringing manufacturer fights his case. The suit may drag for several years and when decided in his favor, he is unable to collect damages from the irresponsible concern, and can only look back over several years of damaged business and expensive litigation, which represents the expense of wiping out the unfair competition. It is

needless to say that when railroad officials are interested in the infringing concern, there are further complications.

It is in the power of railway officials to remedy this state of affairs. To remove the implied restriction relating to suits against railway companies may not be necessary, but it does appear that unless this is done justice requires the greatest care be exercised in the purchase of supplies that may possibly be infringements.

THE DUNCAN TROLLEY BASE AND WHEEL.

The Duncan trolley base herewith illustrated is the outcome of very careful experiments which have exceeded the hopes of its designer and shown it to be among the best. It was patented in April, 1893, which patent contained some of the following features now embodied in the device. The base, which rests on the



roof, is made of the best close gray iron. On this is the spring case 18 inches long and 4 inches inside diameter, also of gray iron. The pole socket is made of malleable iron with the lower end extended to a cam, and is attached to the spring case with a cold rolled steel pin. Each end of the cam is attached by link and chain to the crosshead. By the adjustment of this crosshead, tension adjustment is secured. The patent covers the use of the cam extension to obtain tension on the springs. These bases have given good service on large roads, and besides being serviceable, are attractive in appearance.

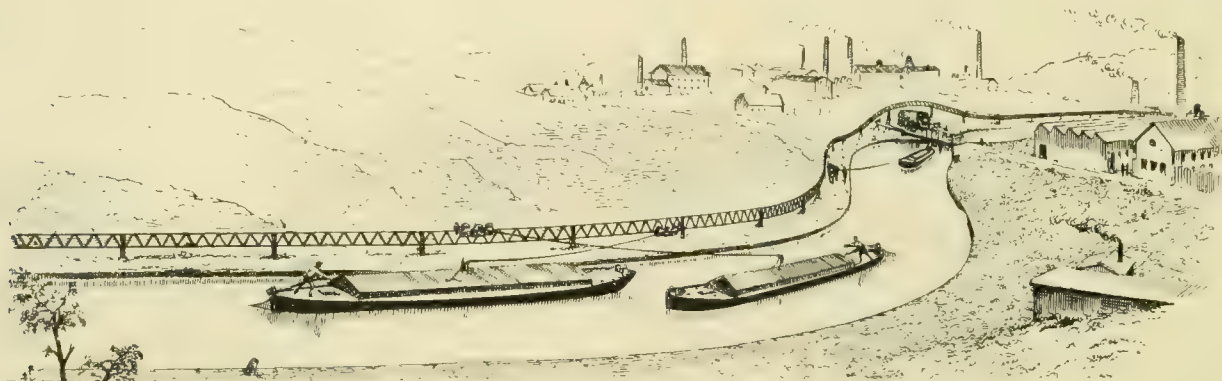
The self-oiling Duncan wheel, also illustrated, has a record of 23,000 miles on the Federal Street & Pleasant Valley Railway of Pittsburg, outwearing four ordinary wheels. The wheel, which is made of bronze fitted with tool steel bushings, revolves on a tool steel pin, the lubrication is supplied from a reservoir of oil inside the wheel. The Simond's Manufacturing Company, of Pittsburg, owns the exclusive rights for the manufacture and sale of these wheels also, besides carrying constantly a stock of gear wheels, pinions, bearings, and similar supplies.



THE WHEEL.

CAWLEY SYSTEM OF CANAL HAULAGE.

In view of the trials of a ropeway system of electric traction for canal boats which is being experimented with on the Erie canal it is of interest to note a system designed by an English engineer, George Cawley,



CAWLEY SYSTEM OF CANAL HAULAGE.

and described in Commerce. In common with the present experiment on the Erie canal, the motors are not to be put on the canal boats but are to run on elevated tracks along the towpath. The Cawley system has two elevated tracks with the motors suspended therefrom. Those on the lower track go in one direction and those on the upper the other. There is no interference with boats going in the other direction or with the mule motors on the towpath. The locomotives grip the rails from above and below and a great amount of traction can be obtained from a very light machine. The locomotive can be controlled from the boat so that the cost is reduced to a minimum.

PITTSBURG PAYS PROFITS.

The Pittsburgh Traction Company, having \$1,900,000 paid capital and \$750,000 funded and \$456,174 unfunded debt, carried during the year ending June 30, 8,673,015 passengers, receiving therefrom \$441,452 and from other sources \$7,993. Expenses were \$262,921, and dividends \$150,000.

The Pittsburgh & Birmingham Traction Company, having \$3,000,000 capital and \$1,500,000 funded debt, carried during the 12 months, 6,245,768 passengers, receiving

therefrom \$301,082 and from other sources \$4,500. Expenses were \$290,610.

The Pittsburgh & West End Company earned \$166,686 on its capital of \$1,500,000 from 3,663,040 passengers. The indebtedness is \$500,000 funded and \$500,000 unfunded. Expenses were \$173,205, and dividends \$30,000.

Receipts for the past year of the Second Avenue Traction Company were \$89,954 and expenses \$52,536. The capital is \$1,000,000 and funded debt \$500,000.

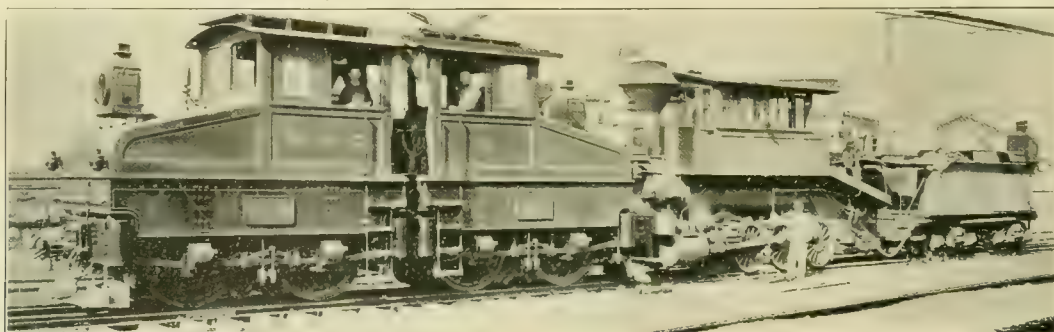
For the 12 months the Citizens' Traction Company carried 14,823,960 passengers, and expended \$339,865. The dividend was \$180,000. The capital stock is \$3,000,000, funded debt \$1,250,000 and unfunded debt \$225,000.

On the Federal Street and Pleasant Valley, receipts were \$393,231 from 7,864,621 passengers and \$13,454 other sources; and expenses of \$304,857. Capital stock is \$1,400,000, funded debt \$1,250,000 and unfunded debt \$79,207. The dividend was \$28,000.

Traffic on the Tarentum Passenger Railway aggregated 315,550 persons, with receipts of \$15,009 and expenses \$11,411.

TWO HISTORICAL PICTURES FROM THE B. & O.

Through the kindness of Lee H. Parker, of the railway engineering department of the General Electrical Company, who is supervising engineer of the work in the Baltimore tunnel, and Charles T. Walker, official photographer to the B. & O. Railroad, we are able to present



THE YOUNGEST AND OLDEST LOCOMOTIVE IN THE UNITED STATES.

the two accompanying views which have an unusual historical interest. The one showing the train order is self explanatory. The other is intended to show the advance in locomotive building in the last 45 years.

The steam locomotive Number 143 is a "Ross Winans" engine, and is believed to be the oldest engine in daily operation in the United States. With 35 tons

drivers or undue sparking at contacts. The second locomotive for this service is soon to be shipped from Schenectady.

STILL ANOTHER FENDER.

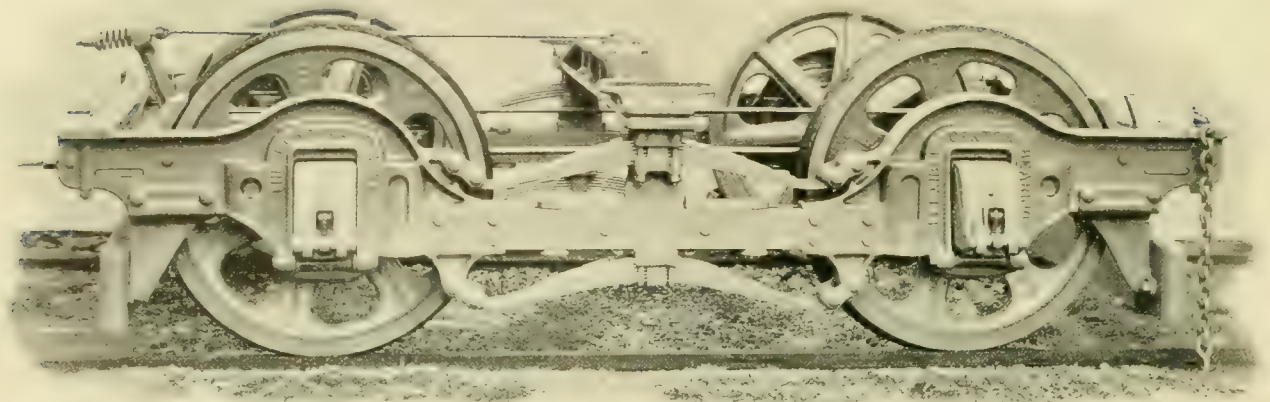
This time it is a broom; just an ordinary, every day broom, such as can be bought for fifteen cents. In St.



COMMEMORATIVE OF A GREAT ADVANCE IN RAILROAD DEVELOPMENT.

weight on its coupled drivers, it was in 1851 the largest steam locomotive. The heavy grades over the Alleghenies called forth its design. The electric locomotive is the 96-ton affair described in our January, 1895, issue. Its best performance is the starting on a grade and pulling through the tunnel of 44 loaded freight cars and three steam locomotives, exerting 60,000 pounds draw-bar pull at the start. This was done without slipping

Louis the other day, an old lady, 79 years of age, suddenly started across the track, in the middle of a block, just as a car approached. There was not time to stop, so the quick witted motorman snatched a broom which was on the platform and reaching out with it pushed the old lady to one side knocking her four feet. The slight scalp wound and scratch on the cheek resulting are not serious.



LORD BALTIMORE BEARING TRUCKS.

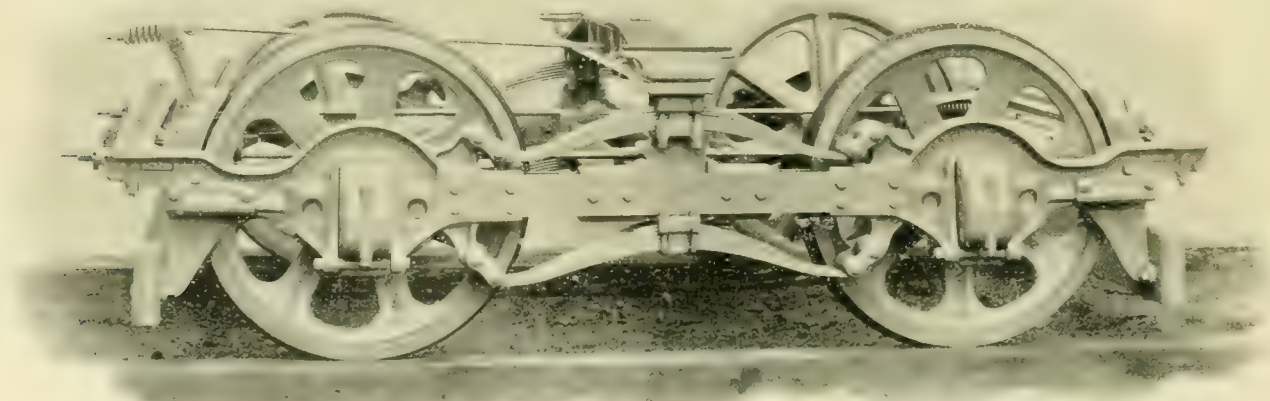
Realizing the demand that is beginning to arise for strong, simple, easy riding swivel trucks for high speed interurban roads, we show in the accompanying engravings, two beautiful trucks, of excellent mechanical design, produced by the Baltimore Car Wheel Company, for a faster and heavier service. These trucks are made with either fixed or swing body bolsters, the heavier ones using journals 8 inches by $3\frac{3}{4}$ inches, both have many of the valuable features of the well-known "Lord Baltimore." The weight of car body and load is supported by half elliptic springs, flexibly hung from the truck frames, all cushioned by volute springs between axle boxes and pedestals. The entire space between axles and side frames is available for motors, the bolsters being above and resting directly upon half elliptic body springs. This company also makes a maximum truck upon same lines and having all the desirable features embodied in the above. In all, the brakes are of the type used on all this company's trucks, being above the axles and allowing wheels to be removed without disturbing them. For strong, easy riding trucks, especially adapted to high speed roads and for steam roads changing to electric, these are excellent designs and will, no doubt, find the same favor as the "Lord Baltimore."

HONESTY OF PURPOSE NOT ENOUGH.

A successful manager of 25 years' service in street railway work said to the writer, the other day: "The only good manager is he who knows how to use the dollar. He must know where to place it, when to place it, how to place it, and how to save it, intelligently. Mistakes are costly, and very many people who are strictly conscientious do not know how to handle other people's money. I have seen it squandered by the ignorant, while others went to the opposite extreme and miserly held back when the operating department actually needed money. The successful manager must not be not only honest but judicious."

LEWIS CAR COMPANY.

It is understood the Lewis Car Company, which was recently capitalized for \$500,000 has purchased from H. H. Isham, of Brooklyn, the works of the defunct Fowler Car Company, at Elizabeth, N. J. The plants to manufacture cars, sweepers, plows and numerous car and electric railway specialties. Works are promised to start January first next with a large force.



PERSONAL.

Dennis W. Sullivan has been elected president of the Coney Island & Brooklyn Railroad Company.

Col. J. H. Cunningham, of the Lynn & Boston Company, has been nominated for state senator from Chelsea, Mass.

D. W. Pugh, of the John Stephenson Company, has been making a western trip, which was fruitful, as his trips always are.

Col. T. S. Williams, secretary of the Brooklyn Heights Railroad Company was married to Mrs. James B. Kelley, Albany.

R. M. Gage, secretary and treasurer of the Topeka Street Railway Company, died October 29 at Colorado Springs of consumption.

Ford O. Rusling has resigned his position with the Buffalo Railway Company to become general manager of the Rochester Railway Company.

H. B. Niles, the genial and efficient electrician and mechanical engineer of the Citizens' Railroad, Indianapolis, spent several days in Chicago the first of this month.

R. M. Douglass, recently with the Syracuse & East Side Railway Company, has been appointed division superintendent of the Brooklyn Heights Railroad Company.

Col. W. H. Sinclair, who has sold his Galveston road will rest a few months, dividing his time between Chicago and relatives in Michigan. He does not intend to remain long out of railway business.

D. A. Diefendorf has been elected treasurer and E. W. Pope, general manager of the Oneonta Street Railway Company, Oneonta, N. Y., succeeding T. D. Tallmadge, who held both offices.

E. K. Stone, Jr., secretary of the Quincy Horse Railway & Carrying Company, was unable to attend the convention, having unfortunately dislocated his left ankle, which compelled him to "locomote on three legs."

The Electric Club of Cleveland has elected the following: C. W. Wason, president; Prof. E. P. Roberts, and J. P. McKinstry, vice-presidents; H. J. Davies, secretary; E. W. Moore, treasurer; board of managers, George M. Hoag, Prof. S. H. Short.

M. C. McWhinney, superintendent of the Marion Street Railway Company, Marion, Ind., was painfully injured, while assisting a workman by holding a chisel. A chip flew from the chisel, when it was struck by the sledge, piercing his neck.

J. V. E. Titus, general manager of the Garton-Daniels Electric Company, Keokuk, Ia., manufacturers of

Garton lightning arresters, was one of the REVIEW the callers. It was raining the day he called, and it is worthy of record that there was no lightning in Chicago that day.

N. H. Walker, superintendent of the Manchester Electric Railway, was presented with a costly diamond stud by a number of citizens of Manchester, N. H., to show their appreciation of his efficient management. Mrs. Walker was remembered with a silver service and piano lamp.

Gen. C. V. Haile, who has been with the Carrollton road, New Orleans, for 30 years, and for 15 years past its superintendent, has resigned. He has made a splendid record and has hosts of friends. It was largely through his efforts that the road, the first in the south, was changed to electric.

H. A. Sage, who will be pleasantly remembered by all old-time convention goers and who dropped out of the harness when he sold his horse lines at Easton, Pa., is again in the field. He has just completed and opened successfully the electric lines of the Ogdensburg, N. Y., Street Railway, of which he is president.

H. M. Sloan, of the Superior Rapid Transit Railway Company, was recently elected general manager of the Calumet Electric Street Railway, Chicago, and has entered upon his duties here. John Farson, of Farson, Leach & Co., bankers, who has been general manager for two years past takes the presidency.

Henry Croskey, the veteran secretary of the Board of Presidents of City Passenger Railways, Philadelphia, has been retired after a faithful service since 1859, on an annuity, as the organization has come to an end on account of the formation of the Union Traction Company. Mr. Croskey was at one time president of the Ridge Avenue Railway Company, but met with reverses.

The presence at Montreal of W. J. Carruthers-Wain, president of the Tramway Association of Great Britain was an honor and pleasure to all who met him, especially those who had made his acquaintance at the Buffalo meeting. Mr. Wain was accompanied by his charming wife who is also a famous traveler. They also visited Chicago, Detroit, Pittsburg, Washington and New York.

B. J. Arnold, the well known consulting engineer of this city who has made a specialty of electric railway work has recently come to a piece of good fortune upon which we heartily congratulate him. The Pumpelly-Sorley Storage Battery Company of which Mr. Arnold was the organizer and chief stockholder has been bought by the Electric Storage Battery Company, of Philadelphia. The sale was based largely on the value of the business built up by Mr. Arnold's efforts, and netted its promoter a handsome profit, which he fully deserves. The amount paid for the business was \$100,000 cash.

TAYLOR TRUCKS AT OTTAWA.

The members of the excursion to Ottawa the Saturday following convention will recognize the scene in the accompanying engraving, which is from a photograph being sent as a souvenir to all those in the excursion party by the Taylor Electric Truck Company, of Troy, N. Y.



TAYLOR TRUCKS AT OTTAWA.

All of the seven cars were mounted on the Taylor improved single trucks, and the delegates were highly pleased with the riding of the cars. There was no end teetering whatever even when running at a high rate of speed. They also noticed the absence of jar when rounding curves and running over frogs.

THIRD RAIL PATENT SUIT.

Answers have been filed in the cases of Siemens & Halske Electric Company vs. the Metropolitan West Side Elevated Railroad for infringement of third rail patents issued in July and August, 1885, to Ernest Werner Siemens; numbers 322,859 and 324,176. The case is defended by the General Electric Company, and the answers were filed by defendants November 4. They enumerate several hundred United States and foreign patents which were issued previous to those of Siemens, and which it is claimed cover the same grounds. The answer further claims that the use of the third rail was well known and had been applied in the art prior to the issuance of the patents to Siemens in 1885. As proof of this are cited numerous articles in the technical press and especially a paper read before the British Society of Arts by Alexander Siemens and Edward Hopkinson on the "Portrush (Ireland) Electric Railway," in April, 1883. The Portrush road employs the third rail.

The following resignations are reported: William H. Gillette, superintendent of the Manitou Beach line, Rochester, N. Y.; M. E. Satchwell, superintendent of the Montgomery Street Railway Company, Montgomery, Ala., to become superintendent of the Jacksonville, Fla., Street Railway; Frank J. J. Sloat, Sandusky Street Railway, Sandusky, O.; Charles E. Barnes, Plymouth & Kingston Street Railway Company, Plymouth, Mass.; J. H. Henderson, Columbus, Ga., Street Railway Company, succeeded by A. B. Norton; R. S. Wakefield, assistant superintendent, Queen, City Railway Company,

Dallas, Texas, to become assistant superintendent Galveston City Railroad.

A GROSS INJUSTICE.

When electrical journals stray into the street railway field they frequently make mistakes which are both amusing and harmless, so evident are the errors to everybody in the railway business. But when a journal comes out in its editorial columns and publishes statements which are not only absolutely false but bear a strong flavor of an advertisement in the guise of reading matter it should not pass without denial.

The following letter under date of October 28, 1895, from Wm. H. Shelmerdine, president of the People's Passenger Railway, of Philadelphia is at once self explanatory.

PECKHAM MOTOR TRUCK & WHEEL COMPANY.

Kingston, N. Y.

Dear Sirs: We have seen the notice in "Electricity" relative to your sales to this company and our action in regard to the Brill trucks. The statement is made in "Electricity" that "at the end of ten (10) months, not one dollar had been spent for repairs on the Brill trucks, and the Peckham trucks had cost this company nearly their original purchase price in rebuilding." *The situation is exactly the reverse:* that is to say, the Peckham trucks cost us comparatively nothing, while the Brill trucks proved much more expensive in maintenance.

Our second and third orders for your trucks—amounting to 490—were placed by us after carefully comparing them in service with the Brill and other trucks in use in Philadelphia, believing *your trucks to be the best in use* and we are still of that opinion.

We write this in justice to the construction of your work and our experience with your trucks under severe conditions, as we think it but justice to you. Yours truly,

WM. H. SHELMERDINE, President.

A STORAGE BATTERY ROAD FOR CHICAGO.

For several years past, W. V. Jacobs, a Chicago real estate man who promoted the Calumet Railway, has been at work securing franchises for two new roads in the southwest part of the city, one known as the Englewood & Chicago Electric Railway, and the other as the Chicago & Morgan Park Street Railway. Very little actual construction work has been done. On November 1, the announcement was made that both these properties had been bought by a Philadelphia syndicate. The syndicate is composed of men interested in the Electric Storage Battery Company of Philadelphia and is represented by J. C. Shaffer. It is the intention to build the system at once, and equip it as a storage battery road by May 1, 1896. In this way the double object will be accomplished of developing valuable franchises and demonstrating what the modern storage battery can do when applied to electric traction. The present plans contemplate fifty-four miles of road and 100 cars. The experiment will be a gigantic one and will be watched with intense interest by a no small number. The Electric Storage Battery Company will act as the construction company, the contract already having been closed. J. C. Shaffer the representative of the syndicate is already well known in the street railway business.



Bowers Bros., of Chicago, are very busy on orders for their two specialties; mica segments and commutator bars.

The works of the Falls Rivet & Machine Company, Cuyahoga Falls, O., were partially burned. Loss, \$35,000.

The Standard Electric Company of Chicago, is putting Standard arc lighting plants into seven towns in Ohio, and many municipal plants in other states.

The New York Fare Register & Supplies Company, of 35 Warren Street, New York, has succeeded to the business of the Hughes Fare Register Company.

The Babcock & Wilcox Company, of Chicago and New York, will install 500-horse-power of its boilers for the Westinghouse Machine Company, East Pittsburg, Pa.

W. B. Crane & Co., Chicago, have sold during the current year 5,000,000 feet of oak ties for use on the Chicago street railways, and had a large business in other places.

The Griffin Wheel Company, of Chicago, has just begun to cast wheels at its Denver foundry. The Chicago foundry is running in full blast, with many orders from street railways.

The Billings & Spencer Company has accepted the selling agency of the Kelsey Electric Railway Specialty Company's goods, which, with the Billings & Spencer goods, will make a very strong line.

Warren Webster & Co., Camden, N. J., are sending out blotters and pamphlets explaining the advantages of the Webster vacuum system of steam heating. Since January 24, there have been 43 large installations.

The Edw. P. Allis Company, of Milwaukee, has recently received an order from the Mansfield Street Railway Company, of Mansfield, O., for a 20 by 36 Allis engine to be belted direct to an incandescent light dynamo.

William Shaw, receiver of the Gilbert Car Manufacturing Company, has been directed by the court to settle all litigation pending against the company and against him as receiver in Illinois, and to pay attorneys in Chicago \$500.

The Siemens & Halske Electric Company has issued three new catalogs, covering electric motors, electric rock drills, and band arc lamps. No one commercially interested in any of the applications of electricity named should be without them.

The Forest City Electric Company, of Chicago, New York and Cleveland, has issued a handsome catalog with more than a score of actual size illustrations of different styles of the "Roll Drop" commutator bars for all leading makes of generators and motors.

The Ball Engine Company, of Erie, Pa., has issued a beautiful little booklet illustrating its various types of engines connected to various makes of generators. It is as much a work of art as are the Ball engines and one in which the company can justly take pride.

The Billings & Spencer Company of Hartford, Conn., has issued a very handsome catalog devoted to its railway department. Billings & Spencer electric railway goods are of the high standard awarded to the other productions of that company the world over.

J. M. Atkinson, formerly of the Walker Manufacturing Company, has been appointed western manager of the Forest City Electric Company, and has opened an office at 1439 Monadnock block, Chicago. Mr. Atkinson will supply "Roll Drop" drop forged commutator bars to the trade.

The American Wheelock Engine Company has opened new offices in the Postal Telegraph Building, New York, and the treasurer, J. H. Hoadley, will hereafter make his headquarters there. The New York office will also be visited frequently by Edward S. Cramp, the noted ship-builder, who is president of the company.

The Terre Haute Car Wheel Works, which owing to slow collections got in financial straits during the depression have been steadily cleaning up their old accounts, and have just wiped out the last of their old debts. The receiver and the company are to be congratulated on the good management which has accomplished this.

The Wells & French Company, of Chicago, has recently shipped 4 cars to Pontiac, Mich., 4 to Ft. Madison, Ia., and 3 to Dayton, O., and is finishing an order of 80 cars for the North Chicago Street Railroad. Street car wheels will be made a specialty by the company, it having overhauled its wheel foundry with this object in view.

The Ohio Brass Company has made arrangements to handle the H & C sleet cutting trolley wheel, and is now prepared to furnish promptly orders for them. This device is too well known to need any special comment, as it was in use during the past season by many of the largest traction companies in the United States, and they found it to be a thoroughly practical means for removing ice and sleet from the trolley wire.

The Empire Electric Insulation Company of Schenectady, N. Y., has been sending to the trade a catalog and price list containing between its leaves, samples of its various varieties of linseed oil insulating cloth and paper.

By special treatment of the oil, the cloth is given properties resembling rubber. The cloth has been recently adopted by several of the leading electrical manufacturing companies and is used by many of the larger street railways.

The Simonds Manufacturing Company, of Pittsburg, reports a recent arrangement whereby it now controls the exclusive manufacture and sale of the Duncan trolley base and wheel. The factory is running over time to keep up a full stock of pinions, trolleys, bearings, etc., so that the company can keep up its reputation for prompt shipment. The Duncan trolley has given satisfactory service for four years on the Pittsburg & Birmingham road and the Duncan wheel is a record breaker.

The Metropolitan Electric Company, Chicago, has just published an enormous catalog, of fully 750 pages, which is a mine of information on electric railway supplies for purchasing agents, construction men and others, to whom it will be sent on application. The Metropolitan has been made general western agent for J. Grant High & Co., manufacturers of switches, switchboards and heavy conductors of improved design and superior finish. The western agents will send a catalog of these also on application.

G. H. Knebel & Co., general contractors, making specialty of street railway construction, is the business title of a new firm, consisting of G. H. Knebel and Charles Gustaveson, who have had a long experience in street railway construction work. Mr. Knebel was until recently the "company" of Clift Wise & Co., and retains the offices at 134 Van Buren street, which were occupied by the last named firm until its recent dissolution. Mr. Knebel is a railroad man of many years' experience, and the new concern will push business energetically.

The Jackson & Sharp Company, of Wilmington, Del., has received an order for 8 cars for the new interurban line at Saginaw, Mich. Of these 6 are passenger motor cars and 2 are combination cars, 41 feet long with Jackson & Sharp double motor railway trucks, vestibules, reversible seats in plush, toilet room, and air brake. These will be the finest cars ever turned out by the works at Wilmington. An order was also received from the Detroit-Mt. Clemens interurban for a 40-foot combination car equipped with air brake. These orders are the result of a trip of George E. Pratt to Michigan.

The Central Electric Company, of Chicago, is just sending out a handsome catalog of the Billings & Spencer drop forged material. The new interchangeable electric headlight is meeting the approval of railway men generally from the fact that it makes a great saving in time and is an unquestionable convenience. The company is sending out large quantities of the Billings & Spencer overhead material and commutator bars. Some very nice orders have been received for the Kelsey noiseless ratchet brake handle and Kelsey uniform tension

trolley stand for which it is general western agent and of which Billings & Spencer are the manufacturers.

The C. & G. Cooper Company, Hamilton, O., is running day and night, and has been for several months, and has received the following orders recently: Two 1500-horse-power cross compound engines for direct coupled generators, Nassau Street Railway Company, Brooklyn; one 800-horse-power cross compound for direct coupled generators, Consolidated Street Railway Company, Atlanta, Ga.; one 800-horse-power tandem compound for Clifton Manufacturing Company; 250-horse-power engine for Vicksburg Electric Light Company, Vicksburg, Miss.; two 800-horse-power for Anaconda Mining Company, Anaconda, Mon.; one 2,000-horse-power for the Fulton Bag & Cotton Company.

The Fitch Salt Company, Bay City, Mich., is making extensive shipments of salt and also their new compound, the triple-chlorides, which scored such a success last winter. The triple-chloride is a clear liquid, much stronger than salt, but which will neither freeze, incrust or evaporate as ordinary brine will do. Its use is by all odds the best possible method for keeping switches and curves in working order during winter months, and it has only to be used once in this way to insure its adoption over the whole line. The quickness with which it acts makes it much more valuable than salt, and while costing no more, can be much more economically applied. The company has sold 30 barrel orders to Green Bay, and Racine; Terre Haute 1; Ft. Wayne 2; C. & G. T. R.R. 6.

The McGuire Manufacturing Company, of this city, has arranged to send east a special train of 36 cars, each car loaded with one of its rotary snow sweepers, consigned to the following roads: Consolidated Traction Company, Jersey City, N. J.; Newark & South Orange Railway Company, Newark, N. J.; Bridgeport Traction Company, Bridgeport, Conn.; Mahoning Valley Railway Company, Youngstown, O.; New Brunswick Traction Company, New Brunswick, N. J.; Columbus Central Railway, Columbus, Ohio; Auburn City Railway Company, Auburn, N. Y.; Beaver Valley Traction Company, Beaver Falls, Pa.; North Hudson County Railway Company, Hoboken, N. J.; Allentown & Lehigh Valley Traction Company, Allentown, Pa.; Nassau Electric Railway Company, Brooklyn, N. Y.; Allegheny Traction Company, Allegheny, Pa.; Fort Pitt Traction Company, Fort Pitt, Pa.

The New Process Rawhide Company of Syracuse, N. Y., received the following letter from R. R. Canfield, superintendent of the road at Windsor, Ont. It speaks for itself.—

"Some time ago this company promised to put on record in a slight way, their appreciation of the durability of your new pinions. This we now do. Since you first introduced it to us about 18 months ago, we have not bought a steel pinion, as we are more than pleased with results from yours. And what commends your goods to

us is, that in all orders given you subsequently for these goods we have found them of a uniform standard. We might say that during the last 60 days we have done more business and carried more people than ever before in the same time—result, your pinions stood the strain. Just one thing more, which we had thought of omitting. We had a pinion offered by another concern at a very much lower figure some time ago and of course thought we had a snap. This now occupies a space in what we call our junk shop. Value—”

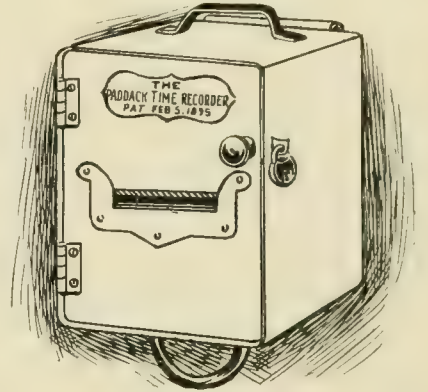
The McGuire Manufacturing Company, of Chicago, is working day and night to enable it to keep up with its orders for rotary track cleaners, and reports the following orders since our last issue: Columbus Central Railway Company, Columbus, O.; Auburn City Railway Company, Auburn, N. Y.; Beaver Valley Traction Company, Beaver Falls, Pa.; North Hudson County Railway Company, Hoboken, N. J.; Allentown & Lehigh Valley Traction Company, Allentown, Pa.; Nassau Electric Railway Company, Brooklyn, N. Y.; Metropolitan Street Railway Company, Kansas City, Mo.; Kansas City & Independence Railway Company, Kansas City, Mo.; Military Post Street Railway Company, Burlington, Vt.; Chicago General Railway Company, Chicago; Norfolk Street Railway Company, Norfolk, Va.; P. A. & M. Traction Company, Allegheny, Pa.; Fort Pitt Traction Company, Pittsburgh, Pa.; City Electric Railway Company, Decatur, Ill.; Elgin City Railway Company, Elgin, Ill. The stove department is feeling the full effect of judicious advertising. Besides the page in the REVIEW, the company issued a very attractive circular in color, also the work of the REVIEW. The sales of the Columbian heater for October reached nearly 500, with the probability of increased sales for November.

H. E. Collins & Co., Pittsburg, sole agents for the Aultman & Taylor Machinery Company's Cahall water-tube boiler, have appointed W. R. Sattler & Co., Havemeyer building, New York, eastern agents. Mr. Sattler is an engineer of national reputation, having been connected with the Brooklyn Navy-Yard. George C. Tewksbury, the other member of the firm, has a wide acquaintance throughout the east, and has been very successful as an engine salesman. H. E. Collins & Co. report the following sales: Mahoning Valley Iron Company, Youngstown, 300-horse-power, second order; Sharon Iron Company, Sharon, Pa., 500-horse-power, second order; Phoenix Glass Company, Pittsburg, 75-horse-power; Citizens' Gas Company, Bridgeport, Conn., 330-horse-power; Isaac Harter Milling Company, Fostoria, O., 500-horse-power; Hainsworth Steel Company, Pittsburg, 500-horse-power; Union Rolling Mill Company, Cleveland, 150-horse-power, third order; Falcon Iron & Nail Works, Niles, O., 150-horse-power; Michigan Alkali Company, Wyandotte, 2,000-horse-power, second order, and Shoenberger Steel Company, Pittsburg, 500-horse-power, sixth order. H. E. Collins & Co. are now shipping the second lot of boilers on the

order for 10,000-horse-power, from the Apollo Iron & Steel Company, Vandergrift, Pa.

PADDACK'S TIME RECORDER.

The very latest device in dating and issuing transfers is an interesting little machine which is already in use on the Duluth lines, and which is the invention of L. E. Paddack, of that city. Each car in service is equipped with a “recorder” which contains a clock and printing dial which is inked by a roller instead of a ribbon to insure a clear impressoin. The transfers bear the badge number of the issuing conductor which in our illustration is “99”



and a consecutive number “25” In issuing, conductor detaches one or more as required, inserts it in the time recorder, pulls a strap and the result is the date and hour, or fraction of hour, and the line by which issued. The receiving conductor also stamps the transfer when taken up, which result is recorded on the reverse side of trans-

<p>ISSUED BY NO. 99</p> <p>25</p> <p>DULUTH STREET RAILWAY CO TRANSFER TICKET.</p> <p>Good, when presented by person to whom issued, for one continuous ride on any line designated on the back of transfer point at bottom of ticket, on first car leaving said transfer point after time stamped. Subject to the rules of the Company and to CONDITIONS ON BACK OF THIS TICKET.</p> <p>TRANSFER POINTS. PAVILION. FOURTH ST STATION. SIXTH AVENUE EAST.</p>	<p>RECEIVED</p> <p>WOODLAND</p> <p>CONDITIONS:</p> <p>This ticket is issued upon the condition that the passenger examine the date, time and transfer point, and see that the same are correct before leaving the car. And upon the further condition that in case of controversy about the ticket the passenger will pay fare and apply at the office of the Company for redress within five days.</p> <p>TRANSFER LINES.</p> <p>Incline to Highland and vice-versa Incline to W. 4th St and vice-versa Woodland or E. 4th St. to 4th St. W. W. 4th St. to E. 4th St. or Woodland</p>
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fer as shown in the illustration. When turned in, the transfer shows its consecutive number, number of issuing conductor, and line upon which he was running, exact time when issued; line on which it was accepted and exact time. The device is simple, and the makers, the Paddack Manufacturing Company state it can not be tampered with and will not easily get out of repair.

MICHIGAN ASSOCIATION.

The Michigan Street Railway Association will meet December 4, at the Morton house, Grand Rapids. Suppliers are specially invited.

NEW PUBLICATIONS.

Compressed Air, by Frank Richards, has just appeared from the press of John Wiley & Sons, New York. It is a very comprehensive treatise on the applications of compressed air and contains some valuable tables.

Alternating Currents is the latest acquisition of the Electro-Technical Series, of which Houston & Kennelly are the authors and the W. J. Johnston Company publisher. It is intended as a popular educational work on the alternating current and its practical applications and as such fulfils well its purpose.

Electricity for Everybody, is the title of a little book by Philip Atkinson, Chicago, published by the Century Company, of New York. As it is intended for non technical readers it is written in popular style. Mr. Atkinson's long experience as an author and lecturer ought to make the work a valuable one for the uninitiated.

Since November 1 the American Engineer and Railroad Journal appears every two weeks instead of monthly as before, and the subscription price is reduced from \$3.00 to \$2.50 per year. The more frequent appearance will enable it to follow current events more closely and no doubt both the changes will be agreeable to its readers. It is also announced that some changes will be made in the scope and character of the paper.

Engineering Contracts and Specifications, by J. B. Johnson, C. E., Engineering News Publishing Company, New York. Even those most experienced in letting contracts sometimes come to a place where they would be glad to have some authority to refer to and for this reason this work ought to be in the hands of every one having anything to do with the drawing up of engineering contracts. It includes a brief synopsis of the law of contracts and illustrative examples of the general and technical clauses of various kinds of engineering specifications. It is thoroughly indexed and classified so as to make it a ready work of reference. The author is one who has had thorough practical experience in the work of which he treats.

James Manley, who was the oldest conductor in St. Louis, having run the first car in that city, died October 26. At the funeral there was a large attendance of street car men, who contributed many handsome floral pieces.

The Mahoning Valley Electric Railway Company, on November 4, opened its line from Youngstown to Niles, O.

WALKER AGENCY IN EUROPE.

F. De La Briere and C. La Blanc, of Paris, have been in this country the past month completing arrangements whereby the electrical machinery of the Walker Manufacturing Company will be sold in France. M. La Blanc is a French Canadian by birth and has done considerable electric railway work in this country. For the last three years he has been one of the European engineers of the General Electric Company. The gentlemen represent a syndicate of French capitalists which is engaged in buying up and electrically equipping horse lines, and of course Walker apparatus will be used on these lines, besides being sold to other parties wishing it. It is claimed that in spite of the duty, American apparatus can be sold cheaper in France than that made there.

WHAT HE SAYS.

It is a good thing sometimes to know what other people think about you. The following is a letter from one Chicago's most prominent business men. What makes it the more valuable is the fact that his expression of the service as provided to the traveling public by the Lake Shore & Michigan Southern Railway, came entirely unsolicited; the plain statement of an experienced traveler, made in a letter touching on other business matters.

The following is the extract from his letter.

"For several years past I have made from two to four trips each month between Chicago and New York. I believe (as I am informed by your conductors) that I have made more trips between Chicago and New York than any other man during the past few years.

"I have always traveled over your road in preference to any other, because by careful comparison with others, I have found not only that the road itself is far superior to any other, but the table and the service are in every respect the best of any road I have ever traveled on. The conductors, stewards, waiters and porters I have found to be uniformly courteous and attentive, adding greatly to the comfort of those who are obliged to travel as much as I am."

For any information in regard to the train service, books covering the matter of Summer Resorts and Tours, address A. J. Smith; G. P. & T. A., Cleveland, O.

BUD ZUNTS,

After co'tin' Miss C'delia for fo' year, believed she was as good a woman as his ma was. "Pore ma. She cert'n'y was the best an' the most worrisome woman thet God ever made. I won't say she was the best, neither, for I been a-co'tin Miss C'delia now three year'n' six mont's an' three nights to-night, 'n' watchin' 'er constant, an' I b'lieve she's ez good a woman ez ma was—ever' bit—'thout 'er worri-some ways, too—pore ma."

Like Cordelia, the Standard arc lamp is just as good as your favorite without the "worrisome ways" of the favorite. Its a double service lamp, simple in construction, perfect mechanically, efficient electrically, weather-proof, moderate in price. Has displaced every other lamp on street lighting circuits.

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of Street Railway Tracks, Power Houses, Etc.



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H. H. WINDSOR, Editor. F. S. KENFIELD, Business Manager.

CORRESPONDENCE

We cordially invite correspondence on all subjects of interest to those engaged in any branch of street railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers.

DOES THE MANAGER WANT ANYTHING?

If you contemplate the purchase of any supply or material, we can save you much time and trouble. Drop a line to THE REVIEW, stating what you are in the market for, and you will promptly receive bids and estimates from all the best dealers in that supply. We make no charge for publishing such notices in our DAILY BULLETIN.

This paper is a member of the Chicago Trade Press Association.

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VOL. 5. DECEMBER 15, 1895. NO. 12

THE executive committee has met at St. Louis, and already plans are well developed for the 1896 convention. That the next convention will in interest and magnitude surpass any yet held is already assured.

NEW YORK CITY surface roads with their well lighted and cleanly kept cars have made such inroads on the traffic of the Manhattan Elevated that its annual report shows 8,086,678 less passengers carried this year than in 1894. Clean cars, well lighted are surely good revenue producers.

It is a pleasure to note as the industry gets older that some of the theoretically excellent ideas that were embodied in the earliest roads and afterwards abandoned because of minor difficulties, are being taken up and successfully worked out. The series-parallel controller was tried in the early days and in spite of its many advantages had to be given up until electric railway men had time and experience enough to work it out successfully. The old Sprague trolley wire hanger has been revived in successful forms and the long dreamed of electric brake is now an every day commercial reality.

ON December 12, we issued the 1,000th number of our DAILY REVIEW BULLETIN, which is our daily issue for the especial use of manufacturers and dealers. It was the first of its kind in the field and the plan has since been followed not only in the street railway but many

other lines. It has been found of great value to buyers and sellers, and any prospective purchaser of street railway supplies or materials is requested to advise the REVIEW of his want and the notice, published free, will instantly put him in touch with all the best dealers in the country.

THE New York Rapid Transit scheme by which the city was to construct an extensive underground system of transportation is once more in the stocks. The commission has spent upwards of \$300,000 and four years' time, and to all appearances the road is as remote a possibility as ever. The supreme court is now asked to name a commission to hear testimony as to whether the plan shall be carried out or not. The opposition claim that the legislative grant by authority of which the road was to be built, is unconstitutional in that the grant is practically a special and local one. All legal questions aside, the scheme of running an 18-foot tunnel through solid rock could not in this generation, nor for many years to come, commend itself as a sound business enterprise to any private corporation. For the city to obligate itself to a debt and interest on an hundred million dollars for the system proposed is unquestionably an outrage on taxpayers and additional evidence that municipal ownership of the transportation lines is unwise and dangerous.

SOME opinions are expressed as to track construction in an article by J. W. Greer this month that will not be considered orthodox by all, but are worth studying, and will furnish food for profitable reflection. Mr. Greer's plea is for more careful and intelligent workmanship in laying light track, rather than the adoption of high, heavy rails. His remarks we suppose are intended more for roads where car and street traffic are light than for the tremendously crowded streets of our largest cities. The extremely high rails now used were called out as much by the paving requirements where there is heavy traffic as by the weight of cars to be run over them. Still, it is indeed a question whether such very high rails are a necessity. As to recent 80 to 90 pound weights there cannot be much doubt that they are required for the sake of the joints where electric cars are running on from one to three minutes headway. Where the joints are welded there is a decided change in the problem, and it certainly seems as if a lighter rail ought to serve the purpose when put on a good foundation.

THE Cleveland accident was the worst which has ever occurred in the annals of street railroading. Certain supposed safety devices were employed, but at the critical moment were not sufficient to prevent a car going into an open draw and plunging a hundred feet into the river. The death list numbers seventeen. The disaster should be sufficient warning to every manager to give the subject his immediate attention, with a view to making any such occurrence an absolute impossibility on his road. Right here in Chicago are many dangerous places where the public on foot as well as in cars are not suf-

ficiently protected. It is only within the past few days that a pedestrian walked into the river at one of the most prominent streets and was rescued with great difficulty. Nor was the man intoxicated; he was, like many another, absorbed in thought and simply kept on walking unmindful of his danger until suddenly he found himself trying to walk on thin air. Taking the railways out of the question, the city of Cleveland is today criminally negligent in neglecting to provide anything like suitable and effective protection to pedestrians and horse vehicles which must cross its lofty viaducts. We publish a complete account of the Cleveland situation as found by a member of the REVIEW staff who spent several days studying the case.

Not enough use is made of the ammeter in teaching motormen. The instructor can expound electrical principles and discuss counter electromotive-force, resistance and torque until doomsday, and he cannot give a new man as clear an idea of how to handle a car with the least power as he can by putting an ammeter on the front platform where the man can see what current he is taking with various movements of the handle. He can learn more in an hour this way than in a week any other way. Although it has by no means been the practice to do this in the past we maintain that it should invariably be a feature in the education of all new men, and that those of the older motormen who have not had the benefit of a training with the ammeter be put through such a course. It is the simplest kind of a matter to arrange for connecting an ammeter on any car. A detachable spring cushioned bracket for holding the ammeter should be made to put on the dash, between the controller and brake staff. Connection can be made at overhead switch or fuse box. With flexible wires having connectors soldered on the ends the work of putting an ammeter on a car will take but a few seconds. Again we repeat, a man can be taught more about correct controller handling in an hour when he has the ammeter in front of him than in a week of verbal explanation.

Will the weight of street railway rolling stock be increased any further, is a question that every manager may well ask with considerable anxiety, though perhaps not with as great anxiety as before the continuous track was an assured success. There has been considerable talk about the great increase in the weight of cars within the last few years and while, of course, the total weight increase due to electrical equipment and high speeds has been enormous it is a question whether since electric traction first came in there has been in good practice much if any increase in the total weight per wheel. In the first place there has been a reduction in the weight of motors, amounting in some cases to 3,000 pounds per car. In the second place the long heavy cars are being put on double trucks so that the strain on the track is much reduced. In spite of this it cannot be denied that there are numerous cases where very long heavy cars are mounted on single trucks, greatly to the detriment of tracks, wheels and trucks. It is poor policy to make a

single truck do the work that ought to be divided between two. If a manager decides that he can best serve his patrons with very long cars it does not follow that it is necessary to put any additional strain on track and special work because the double truck is always available. If grades or severe winters prohibit double trucks the car length and weight should be kept down unless it is expected to pay for an increase in car weight by laying heavier track, renewing special work oftener and footing larger bills for car wheels.

It is becoming more evident every day to those who have studied the subject that if the territory that one electric railway steam plant can serve is to be much increased, the voltage used on the trolley line must be raised. The field of the short electric railway in thickly settled districts is being rapidly filled and future developments will be in the direction of longer and higher speed roads running through more thinly settled territory. Of course there are plenty of suburban districts yet to be invaded with the electric road, but few electric railway engineers would be content with occupying this field, and going no further. It is the desire of everyone connected with the industry to be able to build electric roads into hitherto unprofitable districts and adapt it to cases where it is not now applicable. To do this it is essential that a greater territory be served from one power plant than can be supplied by the 500-volt direct current system. Higher voltage is necessary in the transmission lines. Everyone admits this. Practice in long distance transmission for railway work so far, however, has retained the standard 500-volt direct current for the trolley line, employing an expensive system of transformers for giving a high line voltage and low working voltage for the machines at either end. The economy of this method in the majority of cases is no better, if as good, as that of a direct supply by a number of steam plants located every 10 to 20 miles, and the investment is much greater. The development of the future must be in the direction of a higher pressure current led direct from the generators at the power station to the car, without the interposition of any transforming apparatus to add to the investment and lower the efficiency. The proposition of a higher trolley voltage will not be looked favorably upon by many railway electricians at first thought but it must be remembered that the place where it will be necessary to profitable operation is through the country where there is little danger from the high voltage. The most serious difficulties would be with the insulation on the car and motor. In view of past experience it is not unreasonable to consider that 1,000 volts direct current may be employed with safety. With the commutatorless alternating current induction motor that will probably be on the market soon the difficulties of insulation will be very much reduced and a pressure of several thousand volts made practicable. The lessened trouble with the trolley contact when high pressure and consequently small currents are employed is also a powerful argument if the trains are to require much power.

THE CLEVELAND HORROR.

In the Darkness of a Stormy Night, an Electric Car Plunges off the Central Viaduct—Falls 104 Feet into the Cuyahoga River—17 Lives Lost—Most Awful Accident in the History of Street Railroading.

At 7:35 p. m. on the evening of November 16, there occurred at Cleveland, the most appalling disaster in the annals of street railroading. In the darkness of a stormy night one of the cars of the Cleveland Electric Railway plunged through the open draw of the central viaduct and falling 104 feet sank deep into the muddy bottom of the Cuyahoga river.

The car was one of what the company term combination type; having a vestibule in front; and open platform at rear. There were three doors; one at each end and a sliding door in middle of the car.

There are 8 cross seats each holding 5 passengers; and a narrow aisle extends the length of the inside of the car on the side nearest the curb. The car was 26 feet long, mounted on one 4-wheel truck, was equipped with two 30-horse-power motors, and weighed about 8 tons.

The central viaduct is a steel structure 2,838 feet long, with a draw span of 239 feet. An 8 foot sidewalk extends the entire length at both sides, and between these is a 40-foot roadway in the middle of which are the double tracks of the street railway. These tracks though built by the company have always been considered a part of the viaduct, which belongs to the city; and the city has never failed to collect an annual rental of \$1,500 for the use of these tracks. To just what extent this track ownership involves the city for liability the courts will have to determine, and this feature will complicate the litigation. One thing is certain, if suits are brought both the city and the company will be made defendants to the case.

THE VIADUCT

connects the business portion of the city with the West side, springing from a plateau and carried on a grade of only 3 inches in 100 feet across the valley which rapidly declines to the river which is crossed near the west end of the structure. This valley is a bee-hive of industrial concerns, lumber and coal yards, and railroad tracks. At the extreme west end the viaduct crosses 10 steam tracks on which numerous switch engines are constantly passing during every hour in the 24, and the smoke and steam from which rise in clouds and frequently envelop the roadway above making the place at times a dangerous one for pedestrians, horse vehicles and cars. From these tracks next the river the rising steam often hides the draw to persons approaching from the west. And yet the city authorities have never provided anything like adequate protection at the draw. A pair of iron gates about 4 feet high, made of light iron lattice work are swung by hand when the draw is open. These gates are within 6 inches of the edge, and when closed meet at the center of roadway, closing also the footway. The only means of

fastening the gates is an iron bar, like a bolt, about one inch square which passes through the bottom of each gate and slightly enters a well-worn hole in the floor. A frightened horse could easily plunge through, nor would it be safe for a heavy man to lean against these gates.

A well known Cleveland business man, who drives across the viaduct twice each day said to a REVIEW editor who was inspecting the viaduct,—

“The gates put up at this bridge by the city authorities are so light and flimsy and so poorly fastened that



THE CLEVELAND VIADUCT.

if a team should run away on this viaduct, or almost anything come against them, even with slight force, they would give way and offer no resistance. They are situated right at the edge of the draw and to go through them means that you would go into the river. I think the city is negligent in having a bridge at this height, which is 104 feet, and not supplying gates or other machinery, which would afford some resistance to an object coming against it. I have reason to observe many of the dangers which might happen on this bridge while driving across it. There are a number of steam railroad tracks underneath it, and one, the Nickle Plate, passes by about mid-way between the ground and the viaduct. Smoke and steam from these engines come right up through the floor of the bridge, and in driving across it I have frequently been unable to see my horse at all. These circumstances are liable to lead up to run-aways and if the horse ever came against the gates, which are on this bridge, it would mean that you would go into the river.”

On each side of the draw, at a distance of 200 feet, a derailing switch is placed. Unless this switch is closed the car would make a sharp deflection to the right and run up against a pair of heavy T rails, which rise to a height of 30 inches and are connected at the top by a cross rail securely bolted.

In order to pass this switch, the car stops while the conductor goes ahead, and, if the track is clear, pulls a chain which throws the switch-tongue into straight track. This the conductor of the lost car did. That the course

must have appeared all right to him is evidenced by his pulling the switch. As the car passed, he entered the car at the rear door.

THE ALLEGED SAFETY GATES

are supposed to carry red lanterns at night, which would show directly across the track when draw is open. The bridge tender naturally maintains his lights were burning.



WHERE THE CAR WENT INTO THE RIVER.

On this important point the evidence is conflicting and there is very grave doubt as to the lights having shone.

Indeed, a well-known merchant, a man of unimpeachable character, who drives over this viaduct several times each day was crossing at the time, and was driving almost beside the car. He positively states no red light was to be seen, and pulled his team up almost on the brink of the opening, and just as the car plunged over.

Fast driving is allowed on the viaduct, and the probabilities are the car was under a very fair headway by the time it had traveled the 200 feet. The night was dark and misty, and there is little question the vestibule windows were more or less clouded, making it difficult to see through. In addition large arc lights hang from span wires directly over the center of the roadway, and there is one near the draw. The light from this, shining in the eyes of the motorman of an approaching car, would be very

likely to make objects beyond difficult to see, until he was fairly upon them. The motorman states he saw no red light and was not aware of the danger until within a few feet of the gate. He then reversed, set brakes and jumped, barely avoiding rolling over the edge. The gate through which the car passed is only slightly bent, showing its very feeble resistance, and was still in use a few days ago, without having required any repairs.

In addition to its derailing switch, the line was equipped with an automatic cut-out overhead, which was intended to cut off current 250 feet back from the draw. This cut-out was not in working order and it also appears it had not been in perfect condition for some days. Hence the car approached its fate with car lights showing, and current on, and the motorman gives this as one reason why he did not apprehend danger. The obvious lesson here is the absolute necessity for the most rigid and frequent inspection of devices of this kind. It is far safer to be without safety devices and thus put the entire responsibility on the crew, than to leave them to trust to what is intended as a help, but may prove a snare.

THE DRAW HAD OPENED

to allow a tug with a vessel in tow to pass through, and these were partly through the draw when the car went over. Another tug closely following, at once stopped and began the work of rescue.

As the car approached the chasm there were 21 persons on board. Of these the motorman and three male passengers on the rear platform jumped and were saved; and one man who went down with the wreck was rescued, but afterward died. The remaining 16 met instant and awful death. One of the lost was a beautiful young lady, a niece of the secretary of the company.

The work of rescue was begun almost instantly, and within two hours divers had recovered 14 bodies. The other two were not found until daylight. Our illustration shows the scene at eight o'clock, Sunday morning, with one body just recovered, lying on the scow.

The company did everything in its power, and took the promptest measures possible to render every service it could. At the coroner's inquest, which concluded its deliberations December 9th, the jury decided the facts elicited did not warrant them in attaching responsibility to the company, and no one was held to the grand jury.

In order to understand the escape of the motorman, it may be said the vestibule completely inclosed the left and entire front of platform, leaving an opening at the right as wide as the length of the car step entirely open. Through this he jumped.

In conversation with several railway employes, our editor discovered that several of them entertain the feeling that beyond the question of any doubt the

VESTIBULE WAS LARGELY TO BLAME

for the inability of the motorman to see the danger until too late. There cannot but be a very strong probability that but for the glass window through which the motorman had to look, and dimmed, as it undoubtedly was at the time, he could have discerned the peril and stopped his car in time. A Cleveland railway official said to our editor:

"I can say freely though, that I think a large proportion of the fault lies in the fact that the motorman was behind a vestibule. It had been quite windy during the day, and the car windows were covered with more or less dust. At that time in the evening there was a light rain falling, which hit upon the windows and ran down over them, leaving a streak. The condition of the atmosphere being very heavy and damp made it extremely difficult for the man looking through the glass to get a clear view of anything in front of him. Although there are electric lights on the bridge, at certain angles, you will remember, they throw a very dark shadow, which makes it impossible to look through at times. I am told there is a shadow of this kind in front of the motorman just before reaching the bridge. Whether this is so or not I would not be willing to say. But relative to the difficulty of looking through a glass, I know what I am talking about, and would not hesitate for a moment. I was out about thirty minutes after the accident happened in another portion of the city, and had occasion to observe the weather as I left my residence when it was not raining, and before I had been away ten minutes I got into a very sharp shower. It finally cleared off between 9 and 10 o'clock, and the evening was not very dark after that. Personally, I think the city should keep on all swing bridges an electric gong, which would start ringing as soon as the bridge begins to turn from its bed, and keep ringing until it is back in position again. Some light gong similar to what steam railroads use at their crossings, not to make too much noise to frighten animals."

OTHER BRIDGE DISASTERS.

Such, in brief, is the story of the accident, the third, and most disastrous of its kind. In Portland, Ore., at 6:45 a. m., on November 1, 1893, a car went through the draw of the Madison street bridge, into the Willamette river. It was a foggy morning; there was ice on the rails. The gates were shut, the danger light burning, and 6 passengers out of 20 were drowned. On February 4, 1895, early during a foggy morning, with the thermometer at 12° below zero, a Milwaukee car went through the Kinnickinnic bridge, with brakes on and wheels skidding. The motorman and two passengers were killed.

It is not for the REVIEW to fix the blame in any of these disasters; but it is impossible that such things can occur again and no one be to blame, if it is possible to prevent them. And this is the lesson we bring to every manager throughout the country who has a draw bridge crossing. Your road may be the next, and if it is, no amount of regret, or money consideration to surviving

relatives can undo the past. That a road has operated for years across a possibly dangerous bridge and no disaster occurred is no assurance whatever that none will ever be. Familiarity with danger soon takes the edge from the overhanging sword. Men are but human, and a car crew unconsciously cease to realize the possibilities of peril until some day in a moment of carelessness they awake the world to a tale of horror. To-day it is a bridge disaster; to-morrow a grade crossing accident.

THE LESSON.

What every manager should study, and do it before he does anything else, is the dangerous features of his system. And having realized such, he should spare neither time, nor effort, nor money in employing every reasonable endeavor to rectify the evil. All questions of moral responsibility aside, the sordid one of economy alone is sufficient to demand action. One accident, that is hourly liable, will alone cost more money than a dozen safety plans, any one of which may be a sufficient preventive. These devices, of course, are subject largely to local conditions. What may answer here may be defective there, but we cannot believe that among the hundreds of practical, thinking railway managers, some device cannot be evolved which will be at once effective, positive and reasonably inexpensive. In our judgment the device must be simple, absolutely certain in its operation, and strong enough to do its work. The question of cost is the least important.

In succeeding issues we shall give considerable space in the endeavor to discover just such a device. The city engineer's office is flooded with suggested plans and devices; and the railway offices similarly besieged.

THE JACK-KNIFE BRIDGE.

Where a new bridge is to be erected, or an old one replaced, the jack-knife type offers an absolutely sure protection. Several have already been built in Chicago, and described in former issues of this magazine. It does away with the dangerous and expensive center pier in the channel, and when closed, by its arch form, affords the strongest possible structure. It can be operated by one man; raised in 12 seconds and lowered in 8 seconds; and when open for any purpose completely blocks the entire roadway, and could not be broken through by anything short of heavy artillery. No vehicle or street car could possibly batter through this impregnable barrier.

OBITUARY.

Miss Bessie J. Henry, only daughter of George W. Henry, died November 26, at the home of her father, in Joliet, Ills. She was exceedingly popular, and since the death of her mother, 13 years ago, had entire charge of the household.

After the most severe tests and the keenest competition the McGuire Manufacturing Company, Chicago, has been awarded the contract for 205 trucks by Cincinnati Street Railway Company, Cincinnati, Ohio.

ST. LOUIS CONVENTION ARRANGEMENTS.

The executive committee of the American Street Railway Association met at St. Louis, December 9, to arrange for the convention to be held there next October. Those present were H. M. Littell of Brooklyn, W. H. Jackson of Nashville, J. W. Morgan of Camden, A. Markle of Hazleton, Pa., W. F. Kelley of Columbus and Secretary T. C. Penington of Chicago. Robert McCulloch, chairman of the local committee of arrangements met with the committee by request and offered valuable suggestions. The Southern Hotel was chosen at headquarters, and the Olympic theater across the street from the hotel engaged as the place of meeting. The time of meeting is October 20, 21 and 22. Sessions will be from 10 a. m. until 2 p. m. on Tuesday and Thursday and from 10 to 12 a. m. on Wednesday. Wednesday afternoon the local committee will provide entertainment. The exhibit has not been selected but will be secured by the local committee of which Robert McCulloch is chairman. Six papers are proposed but as they are not yet promised cannot be announced at present. The St. Louis people propose to make this the most successful and enthusiastic convention in the history of the association. Knowing St. Louis, hospitality and the universal feeling of street railway and supply men over the country we are assured that they will succeed.

UNDER RUNNING TROLLEY SUIT.

An important decision was rendered at New Haven, Conn., December 7, by Judge Townsend in the case of the Thomson-Houston Electric Company against the Winchester Avenue Railroad, regarding the right to use the under running trolley. The case was defended by the Westinghouse Company. The petition was for a perpetual injunction against the use of the under running trolley, as based on two Van Depoele patents. The junction was granted on patent number 495,443. This patent claims the use of the under running trolley with provision for lateral movement. This decision practically gives the General Electric Company the right to manufacture and sell the under running trolley as it exists at present on the majority of roads. The case will be appealed.

WILL BE A FREIGHT ROAD.

The Indiana Electric Railway Company, which will run between Elkhart and Goshen, will have 20 miles of track when completed. The two cities are 7 miles apart and the company will have a large freight business in addition to the passenger traffic. J. J. Burns, Marquette building, Chicago, is president; W. L. Stonex, Goshen, secretary; H. P. Myton, Goshen, manager. A specially constructed motor car will be used for freight service as standard steam road freight cars will be hauled. President Burns is now working on the plans. At present the company is leasing power, but will build a power house in the spring. The present equipment con-

sists of a 125-horse-power Bates engine, made by the Bates Machine Company, Joliet, Ill., and Gates generator. The motors are 35-horse-power card motors single equipment for the line in Goshen, but two 35-horse-power will be used on the interurban cars. The track is laid with 56 and 60-pound T-rail, and Ohio Brass Company's overhead material is used.

STORM IN CHICAGO.

A more troublesome storm for street railways than that which visited Chicago on the night of November 25-26, could not very well be devised. It opened up with rain and sleet, gradually changing to sleet and snow, and wound up with a blizzard. The ice formed on overhead wires much more rapidly than is usual in sleet storms and it was only a matter of three or four hours from the time the festivities opened up until telephone



WHY WIRES FELL.

and telegraph wires began to fall by the hundreds and the thousands. These grounded the trolley wires in many places and in some cases such a mass of telephone wires fell as to crush the railway overhead construction and blockade the tracks with wires and poles. These tribulations were sufficient, but right on top of all this trouble came a heavy fall of snow. Bucking snow with the overhead system out of operation in many places is not a very speedy job. On some of the suburban roads cars were tied up all night between towns and the passengers remained there until morning.

Perhaps worst of all were the idiotic comments made since the storm on the danger from the overhead trolley wires. If the newspapers had enlarged on the danger of the telephone and fire alarm wires it would have been more to the point. The railway wires were firmly in place where they belonged until the telephone and fire alarm wires fell on them. Why should a railway be to blame for the failures and shortcomings of other companies' overhead construction? How can the railway wires be expected to stay up with tons and tons of telephone and telegraph wires and poles falling on them? City Electrician Barrett has taken advantage of the situation to make it appear through numerous interviews in the daily papers that the trolley is to blame for all the

trouble with telephone and telegraph wires. B. E. Sunny of the General Electric Company in the Times-Herald of December 1, shows the train of reasoning (?) indulged in by Mr. Barrett.

"The sensational statement that it will cost \$10,000 to repair the fire alarm wires because of the injury done them by the overhead trolley is about as accurate as many other of the wild utterances on the subject emanating from the city hall. The damage to the extent of \$500 was done by sleet entirely, and the same wrecking of wires of all kinds by sleet has occurred in Chicago at least once every three years, as far back as can be remembered. Professor Barrett knows this thoroughly, and he also knows that the telegraph and telephone people were largely influenced in putting their wires underground by the desire to avoid the money loss to property and the interruption to service occasioned by sleet storms.

"The recent injury to the wires from sleet is ingeniously used as a peg on which the professor can hang his prejudice against all kinds of overhead wires. He jumbles sleet and trolleys together in his statements in a most remarkable way, so that one is justified in believing that if it were not for the presence of trolleys there would have been no sleet, and anyway the sleet did no harm—it was the trolleys.

"There are no reports that any of the trolleys broke down, but the other wires, including the fire alarm, broke and fell on the trolleys."

In fact, when the whole truth is known, it is found that there is a serious case against the telephone, telegraph and city fire alarm people and that the street railway companies have excellent grounds to recover damages from the city, the telegraph, and the telephone companies. The damage done to the railway overhead work by other pole lines, not of sufficient strength to stand the storm is certainly directly due to the weakness of such other lines, and this fact alone is certainly sufficient to make it reasonably sure that the railway company could collect damages. But the matter does not end there. The telephone, telegraph and fire alarm wires have in many cases been allowed to remain in use until they are almost "streaks of rust." We are not taking any rumor for the foundation of this statement. A REVIEW representative, after the storm made a careful personal inspection of the territory in which the most serious troubles occurred. As a result, we have now on exhibition at this office the collection of wires shown in the accompanying engraving. The bottom one is a No. 0 trolley. The second from the bottom is No. 6, shown for sake of comparison. The remaining three are pieces selected at random from telephone and fire alarm wires which fell in the storm. It is hard to tell what size they were originally. Over rust and all they are in their weakest places about No. 14 and with rust removed about No. 16. The rust however is not confined to the surface but has penetrated in such a way that the wire is brittle. Four right angle bends back and forth at one point will break it.

The Metropolitan Elevated pulled through with less trouble than any other electric transportation line, and hauled an unusual number of passengers because of the blockade of other routes. It only had two short delays, and one of those was caused by a fire in a building near the structure. The cable lines suffered practically no detentions whatever.

Such a storm has not visited the city for years and it is to be hoped that it will be as long again before another such will come.

MICHIGAN ASSOCIATION MEETS.

The Michigan Street Railway Association had a valuable session, December 4, at Grand Rapids. J. F. Lee, of the Lansing Street Railway, read a paper on franchises. Fire and accident insurance and the construction and operation of street railways were fully discussed. The new officers are W. L. Jenks, Port Huron, president; W. Worth Bean, St. Joseph, vice-president; B. S. Hanchett, Jr., Grand Rapids, secretary and treasurer; executive committee, E. E. Downs, Battle Creek; Charles Swift, Detroit, and the officers. The next meeting will be December 2, 1896, the place to be chosen by the executive committee. Those present were: G. S. Johnson and B. S. Hanchett, Jr., Grand Rapids; W. Worth Bean of St. Joseph; W. L. Jenks and William Canham, Port Huron; Major Downs, Lansing; E. E. Downs, Battle Creek; S. D. H. Ralph, Owosso, and C. L. Harvey of Bay City.

WASON LEAVES BIG CONSOLIDATED.

C. W. Wason has severed his connection as director and purchasing agent of the Big Consolidated, Cleveland. Henry Everett went out as vice-president only recently. The withdrawal doubtless is occasioned by the sharp fight now on between the Big Consolidated and the A. B. C. suburban—an Everett line—which is trying to force an entrance into Cleveland. The Big Consolidated offered to haul the A. B. C. cars, furnishing crew and power to and from the heart of the city, for what local fares it could collect. The Big Consolidated is a Tom Johnson line; as is also the Detroit citizens, against which the Detroit Railway—an Everett road is waging war. The resignation of Mr. Wason makes the fourth Everett director to go out of the Big Consolidated in two years.

\$7,500 FOR A DEATH.

Eugene Medinger secured a verdict of \$7,500 against the Brooklyn Heights Railroad Company, on account of the death of his wife. This was the first case brought under the new law, removing the limit of \$5,000. Medinger sued for \$50,000. The company appealed.

THE STREET RAILWAY REVIEW force was increased on December 9th by the addition of the finest eight-pound girl in Cook county. The young lady has taken permanent quarters at the residence of the business manager.



WRONG WAY TO STAND HORSE WITH VEHICLE
BACKED TO CURB.



CORRECT WAY TO STAND HORSE WITH VEHICLE
BACKED TO CURB.

PREVENTING HINDRANCE BY TEAMS.

M. K. Bowen, Superintendent of the Chicago City Railway Company, has begun a crusade against teamsters who obstruct the tracks. The North and West Side companies have also joined in the movement, which has been so successful that the trains can now make their schedule, being free from the annoyance of loafing teamsters who endeavor to monopolize the track. Letters were sent to the leading wholesale and retail houses, teaming companies, express companies and other concerns using teams, calling their attention to the delay to traffic on account of the dilatory and monopolistic tendencies of the teamsters, and asking their co-operation in the enforcement of city ordinance. For a day or two policemen were detailed to ride on the cars, whose duty was to order teamsters off the track and arrest those who did not obey with alacrity. A few arrests with fines of \$5 was enough to cure the stubborn element, the other teamsters readily co-operating with the companies.

Mr. Bowen also had a lot of cards printed. On one side were the two engravings shown herewith, and the following:

Delays to cars and passengers, and in some instances, damages to wagons or cars and injuries to horses result from drivers backing vehicles up to curb and allowing horses to stand with their heads (or shaft or tongue of vehicle), projecting out over street railway tracks.

Horses heads should be turned in direction cars run on nearest street railway track. If horses heads are turned in opposite direction to which cars run, the horses are liable to move while vehicle or car is passing and cause accidents.

Copy of City Ordinance No. 2082.

Right of Way. Penalty for Obstructing.

1517.—The cars shall have the right to the tracks as against any person, carriage, vehicle or incumbrance put, driven or being thereon with a view to delay or embarrass the progress of the cars; and, no person shall obstruct the said tracks, or obstruct or prevent the cars from running or progressing thereon by placing, driving or stopping or causing to be driven at a slow pace or stopped, any vehicle or other obstacle in, upon, across, along or near said tracks in the way of any car if there shall be an opportunity to turn off, after being notified by the ringing of the car bell, under a penalty of five dollars.

Whenever a conductor saw a horse turned the wrong way, he hunted up the driver to whom he gave one of

the cards. The campaign of education has been a great success, and through Mr. Bowen's courtesy we are able to give it to the fraternity.

The supreme court of New York City has just rendered a decision on this subject which says:

In the middle of a block a railroad company has the paramount or superior right to the use of the tracks, and it is the duty of any vehicle occupying a track to get out of the way with reasonable diligence and care, but that rule of law does not apply to street crossings. There the vehicle has the same right of way as the car, the car the same right of way as the vehicle. There is no superior or paramount right either to the vehicle or car. The law imposes on both the driver of the vehicle and the party having the car in charge the exercise of proper care or diligence to avoid injury or accident. Their rights are common at the intersection of streets, and both of them are bound to be careful.

BOOSTER AT CHESTER, PA.

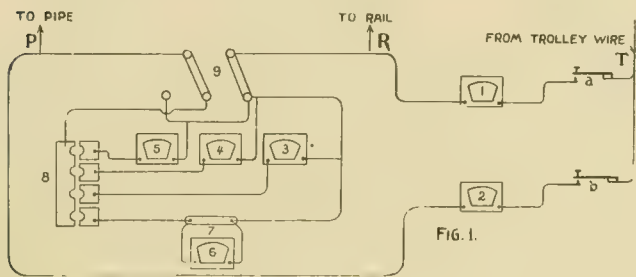
The Chester Traction Company has put in a "booster" at its power house for the purpose of saving the feed wire that would otherwise be required on some of its long lines where there is occasionally a heavy holiday traffic and where a great idle investment in feed wire would otherwise be required. The boosters were made of old Short generators and these generators are so arranged that they can be used either as boosters or regular generators in multiple with the other generators in the station. A booster, as it is hardly necessary to explain, is a generator put in series with a feeder for the purpose of automatically raising the voltage on the feeder as the load rises, so as to maintain a constant voltage at a distant point on the feeder. This is accomplished by exciting the fields of the booster by all or a part of the current on the feeder. Thus as the load rises, the current around the fields raises the voltage to correspond and the drop in the feeder is compensated for. This would not be an economical arrangement for every day service, as the power taken to run the boosters is a dead loss, but it is cheaper to buy coal to run the booster a few hours out of a month when there is a heavy load on a long feeder than to pay interest on the heavy investment in feed wire that would otherwise be required.

ELECTROLYSIS PREVENTION AT NEWARK, NEW JERSEY.

BY HAROLD P. BROWN.

In July, 1894, the Board of Street and Water Commissioners of Newark, N. J., had reason to suspect that the city's buried property was being injured and, in conjunction with the two gas companies, employed the writer to make a thorough examination of the electrical condition of the water and gas pipes.

Instead of making galvanometer measurements between the earth and the pipes, which are practically worthless; or mere voltmeter tests between rails and pipes, which may be misleading, a wagon was equipped with a switchboard and a set of six Weston instruments, as shown in Figure 1. The binding posts T, R and P,



are connected respectively to the trolley wire, the rail and the pipe. Contact spots on both of the latter are carefully filed until clean and bright, and amalgamated terminals are then clamped upon them. Nos. 1 to 5 are voltmeters, Nos. 1 and 2 read to 750 volts and measure the pressure between trolley wire and rail and between trolley wire and pipe. Nos. 3, 4 and 5 measure the pressure between rail and pipe. No. 3 reads to 1.5 volts in thousandths; No. 4 reads to 6 volts in thirtieths and No. 5 up to 150 volts. Any one of the three may be placed in circuit by the switch 8 or have its terminals reversed by switch 9. Heavy wires are used to connect R, 9, 8 and P so that shunt 7 and millivoltmeter 6 can be thrown in to read amperes flowing through shunt between pipe and rail.

At each halt along every street having an electric road, readings were made between trolley and rail, by pressing key a, between trolley and pipe, by pressing key b, and between rail and pipe by throwing in 3, 4 or 5. After noting the third reading, voltmeter 3 or 4 is left in circuit and key a again closed, and then key b. If connection at either R or P is poor or if the rail is badly bonded, or the pipe is disconnected, the closing of key a, will increase and the closing of key b, decrease the former reading, or vice versa. In other words the low reading voltmeter is used as a Wheatstone bridge galvanometer to detect any poor connections and to verify with mathematical accuracy all three readings. When the low reading needle does not quiver as a and b are closed and opened, its indication gives the exact difference of pressure between rail and pipe, and the sum of the second

and third readings should equal the first. When the third reading runs above three volts the shunt 7 is put into circuit and flow of current noted, also fall of pressure if any. It has frequently been said that voltage measurements between rail and pipe were no indication of current flow from one to the other. This may be true in perfectly dry soil; but when, as occasionally happened in Newark, there was current flow of 25 amperes through the long leading wires and various contacts on the switchboard, with a pressure of 6 to 8 volts which fell but little when the shunt 7 was put in, it was very evident that the current flow through the earth was large. The switchboard circuit from P to R with the connecting wires is of course in parallel with the moist earth which touches both pipe and rails and therefore receives but a portion of the current.

This method of measurement gives absolute accuracy to the result; doubly checks every reading; detects any poor contact of testing wires or of the pipe and rail tested; shows whether the feeder-wires are sufficient for their work and whether the rail bonds are in bad condition. The time of each reading was also noted so that variations in power house load could be taken into account. All of these factors must be accurately known before a correct diagnosis can be made. The average readings were then marked upon a large map, the positive being in red and the negative in green. It was then seen that the pipes were suffering badly within a radius of 1,000 feet from each powerhouse, some readings running as high as 8 volts against the pipes; while in other localities the rail feeders were insufficient and the rail bonds were poor. One line of rails was 15 volts positive to the pipes. Another line showed 50 volts drop in 90 feet. As some doubt was felt concerning the reliability of electrical measurements in locating electrolytic corrosion, excavations were made in the districts where the pipes were positive to the rails and a number of badly injured pipes disclosed. Since then it has been necessary to replace a large number of lead service pipes in the districts indicated.

The board called before it representatives of the two roads concerned and asked their hearty co-operation in checking electrolysis of the pipes. Both promised to do all in their power to stop the trouble. The Consolidated Traction Company promptly redeemed its promise but the smaller road delayed until the method of cure was shown to be successful.

To describe the process used at all three power houses and since adopted at Buffalo and elsewhere, I must first briefly define electrolysis and its causes, though I know that the subject is now familiar to electric railway managers. When an electric current passes from one metal plate to another through a chemical compound like water, the fluid is decomposed; its oxygen appears

at the positive plate from which the current flows and its hydrogen at the negative plate. The positive plate, if an ordinary metal, is corroded by the oxygen. When the proper solution is used, there is also a deposition of the positive metal on the negative plate, but this does not occur in the moisture ordinarily present under our streets. The current from an electric railway power house after leaving the dynamos, passes along the trolley wire and through the motors to the rails. Here it finds two paths to follow back to the dynamo; one through the rails and their connecting wires and the other through the moist earth to the net-work of gas and water pipes, whose conductivity frequently exceeds that of the rails. It then follows the pipes to within a short distance of the power house, where it again passes through the earth to the rails and completes the circuit to the dynamos. The corrosion of the pipes takes place at the points where it leaves them. As lead suffers at more than six times the rate of iron, the lead joints and service pipes receive the greatest amount of injury.

If the positive terminal of the dynamos is connected to the trolley wire, as it always should be, the points where the current leaves and damages the pipes are generally within 500 to 1,500 feet radius from the power house. The corrosion of the pipes is therefore confined to a comparatively small area. If the negative terminal leads to the trolley wire, the pipes suffer corrosion within a similar radius from the end of each line of rails and the area of damage is thus largely increased. The following diagram (Fig. 2) will perhaps make this clearer.

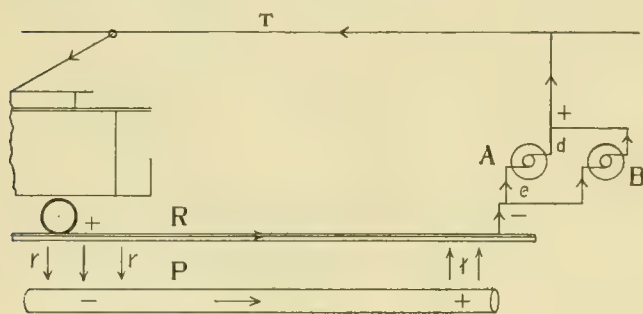


FIG. 2.

In Fig. 2, A and B represent the dynamos whose outgoing or positive poles D are connected to the trolley wire T. The current, as shown by the arrows, passes along the trolley wire, through the trolley pole and motors to the rails R. Here it has a choice of returning by the rails or passing through the earth at r r, near the ends of the lines, along the pipe P and again through the earth to the rails at t, near the power house. From one-fifth to one-quarter of the current ordinarily returns upon the pipes in cities having large railways and a network of pipes. It is evident that at r r, where the current leaves the rails, the electrolytic action is at their expense; while at t the current leaves and corrodes the pipes. The rails are heavy enough to stand this loss without serious damage, but the pipes and their lead joints should never be subjected to it. Were the rails electrically continuous a much smaller portion of the current would return on the pipes.

But the bonds between the rails are usually of copper wire or rod mechanically attached to each end of the rail. Recent tests at the Edison Laboratory have shown that what is known as the thermo-electric effect produced by a current's flowing through a series of steel and copper contacts, causes more than six times the loss due to the resistance of the metals themselves. Therefore copper bonding at its best is poor. Moreover the resistance of these bonds is daily increased by the unavoidable rusting of the rails at the contact points and by the motion caused by the hammer blows of the wheels. This constantly tends to increase the current flow on the pipes and is an excellent reason for frequent electrical tests of rail joints and for the establishing of a limit of loss and current flow at each joint.

I would suggest that this limit be 1,000 amperes to each nine square inches of rail section, and one quarter of a volt loss at each joint with maximum current. Returning to the method of pipe protection used in Newark, a plan was submitted by the writer to the engineers of the two railway companies. They agreed that it would protect the pipes, but feared that it would waste considerable motive power. It was tested late one night at the Boyd street power house of the Consolidated Traction Company, with a single wire leading to a point where the pipes were seven volts positive to the rails and were suffering badly. The instant the method was applied, the same point upon the pipes became three volts negative, and the power house load dropped sixty horse-power.

As this power house was heavily overloaded and had no spare boilers or engines, this experiment was reluctantly made by the company, but the result led to the immediate adoption of the system. George E. Talcott, chief engineer of the company, has recently written me that not only had the system entirely checked electrolysis, but that it had saved them 300-horse-power in their smaller power house alone.

This surprising result is an impressive object-lesson to railway managers who wish to cut down operating expenses and save future litigation with the owners of the pipes.

To many electricians Mr. Talcott's statement seems incredible; but let me ask such doubters to calculate how many ohms resistance in the path of 2,000 amperes is necessary to cause a drop to 400 volts? This is called a drop of 27 per cent; it is a transmission loss of 27 per cent upon an incandescent lamp circuit; but with an electric motor, a 27 per cent drop means slower speed and correspondingly greater current to do the same work. Therefore, the 27 per cent drop of pressure means about 47 per cent actual loss. Bearing this in mind, it is not difficult to see how a slight reduction in external resistance on a railway circuit can make a heavy saving in power. The greatest of all railway transmission losses is encountered in the rail returns, and yet the fact is seldom appreciated that most of this is due to the thermo-electric action between rail and bond wire.

Referring to Fig. 2, the electrical map of Newark showed that at many points *r r*, distant from the power-house, the rails were as much as 15 volts positive to the pipes below them; while at many points *t*, near the power-house, the pipes were 3 to 8 volts positive to the rails over them. Now, the question resolves itself into two problems: first, to maintain the pipes more negative than the rails at all points, thereby checking corrosion of the pipes, except at some bad joint, but at the same time slightly increasing the current flow on them; and, second, to maintain the distant rails at *r r* and the near pipes at *t* at nearly the same potential, thereby cutting down the pipe current to its minimum. The first of these is well understood by railway electricians, but the second does not seem to be clear. Now, if the pipes at *t* are made "more negative than the rails," a path for the current must be provided that will be of far less resistance than the path through the earth at *t* and then through the rails. It follows that the current flow on the pipes will thereby be increased, and will be largely due to the pressure of 15 volts between distant rails and pipes at *r r*. If we can then cut that pressure down to one volt, the pipe current will then be proportionately reduced, and all danger of corrosion of pipes will be brought down to its lowest terms. Though I have several times described in print the Newark method of checking electrolysis, I seem to have been unable to put sufficient emphasis on the second requirement and upon the device by which I have completely satisfied it.

As shown in Fig. 3, the positive current is carried to the trolley wire, but the negative terminal of one dynamo, B, is disconnected from the rail return wire and joined to a wire, *m*, leading to the points on the pipes which show the greatest amount of corrosion. The electrical pressure of this dynamo B is then increased until the pipes are made two or three volts negative to the rails at the points where they were previously positive; since the positive poles of dynamos A and B are joined, this difference of pressure asserts itself by keeping the pipes more negative than the rails.

There is no difficulty in maintaining the two sets of dynamos at just the proper difference of pressure to secure this result, and the larger railways will be eager enough to adopt the scheme when they realize that they can thus reduce their station load about 20 per cent, for the work at present expended in the current's reaching, corroding and leaving the pipes is entirely lost.

This method entirely checks electrolysis of the pipes, except around some poor joint on the same. Such a joint can be detected by a low reading volt meter on the surface of the street, and the action stopped by continuing the wire *m*, diminished in size, to a point beyond the poor joint. It is true that, as far as described, the tendency of this method is to slightly increase the current flow on the pipes, but this is only the first step of the cure.

As above stated the current reaches the pipes at *r r* near the end of the railroad lines and here a difference of 15 or more volts has often been found, the rails being positive to the pipes. This difference produces a heavy flow through the pipes and is caused by poor bonding

between the rails and by insufficient rail feeder-wires or by the fact that the network of pipes may lead directly to the power house while the line of rails may take a roundabout course. But by carrying out from the higher pressure dynamo B another wire *m* to the rail at *r r*, the

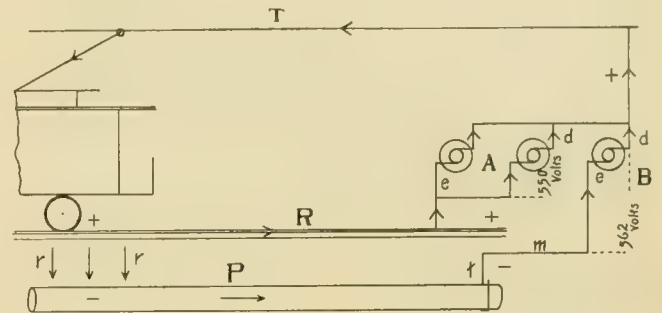


FIG. 3.

difference of pressure between the distant rails and pipes at *r r* may be cut down to 1 or 2 volts and the current flow correspondingly reduced. Then with the proper feeder regulators in the wires *m*, it is easy to keep the rails at *r r* and the pipes at *t* at nearly the same potential and the current flow on the pipes is thus cut down to a minimum. This is the vital point in the solution of the electrolysis problem and yet it is generally overlooked.

However, even this scheme would not be permanent if the ordinary methods were used of making electrical connections with the pipes. Copper or brass plugs inserted into the pipes as contact points to which pipe feeder wires are soldered, cause a heavy loss by thermoelectric action of the current passing through them and at the same time, as gas engineers know, set up a galvanic action of their own which will soon destroy the contact and ultimately puncture the pipe.

An iron band clamped on a lead ring around a pipe is also a bad form of contact and certain to rust even though covered with tape, paint and cement. Four of such bands, each about 3 inches wide, on a 28-inch gas pipe directly in front of a large power house in Buffalo and soldered to copper wires aggregating a section of 2 square inches, leading to the negative terminal of the dynamos, still left the pipe six-tenths of a volt positive to the rails. Two of the lead bands had been put on within six months; no acid was used in the soldering and yet the lead was badly corroded and the pipe marked.

This shows plainly that the old scheme of connecting pipes to the negative pole of the dynamo gives but slight and temporary relief to the pipes, for electrolytic corrosion will take place when the pipes are even one hundredth of a volt positive. After several years of experiment at the Edison Laboratory, but one contact metal or alloy was found that on a steel rail or an iron pipe, would prevent a film of iron rust from penetrating between the surfaces and ruining the contact. This "Plastic Alloy," as it is called, in connection with Mr. Edison's simple process of amalgamating iron or steel, forms a perfect electrical "union" of the metals, instead of a mere mechanical contact; its resistance is negligible even with 2,000 amperes and it will neither rust nor break.

A few square inches on the top of the pipe are filed clean of paint or scale and rubbed with a silvery metal compound invented by Mr. Edison, which at once turns any iron rust into a pure metallic iron and amalgamates the surface.

Metallurgists have long considered impossible a stable iron amalgam, but it nevertheless exists and is so permanent that neither water nor any re-agent which it will encounter under the streets can decompose or rust the iron surface beneath it.

A U shaped bolt is then slipped under the pipe and a cast iron yoke placed over it. The end of feeder-wire m has been brazed to a copper saddle one-eighth of an inch thick, fitted between top of pipe and bottom of yoke. The center of the saddle on each side of the wire is cut away to form a receptacle into which, after the copper has been amalgamated, is placed the plastic alloy. The nuts are then tightened up and locked.

When a joint between iron and copper is thus prepared all of the contact resistance disappears, and the thermo-electric loss is much reduced. But when this alloy is used between iron or steel surfaces, both contact resistance and thermo-electric loss are eliminated. Further reduction of current flow upon the pipes and of transmission losses of electric power can be made by improving the rail returns. The ordinary method of doing this is to connect more copper feed wires to the rails. But here are the rails themselves, which, could they be made electrically continuous, would offer a conducting path with which no practical amount of copper could compete; four 90-pound rails, for instance, are equal to four square inches of copper. Such electrical continuity cannot be obtained by welded or cast joints as the unavoidable flux or scale is of high resistance. That it can be obtained by Mr. Edison's plastic rail bond is shown by the following table of results of a large number of tests made at his laboratory.

COPPER.		Drop of same due to copper resistance only.	PLASTIC BOND.			Amperes.
Amperes.	Copper Bond $\frac{5}{8}$ in diameter, with best mechanical contact of ten times its cross section; surfaces bright		90 lb Girder Rail joint with Plastic Rail Bond	Same with fish plate loosened $\frac{1}{4}$ of an inch	60 lb T Rail joint with Plastic Rail Bond.	
50	Drop 0.05 Volts	0.0025	0.0025	0.0025	0.005	50
100	0.08	0.005	0.005	0.005	0.009	100
200	0.15	0.01	0.01	0.01	0.012	200
300	0.215	0.0175	0.0125	0.0125	0.0167	300
400	0.27	0.0225	0.02	0.02	0.025	400
500	0.315	0.03	0.0225	0.0225	0.034	500
600	0.35	0.035	0.03	0.03	0.037	600
700	0.38	0.04	0.035	0.035	0.041	700
800	0.41	0.0475	0.04	0.04	0.05	800
900	0.45	0.05	0.045	0.045	0.067	900
1,000	0.455	0.06	0.0475	0.0475	0.075	1,000
1,100	0.46	0.065	0.05	0.05	0.083	1,100
1,200	0.47	0.07	0.06	0.06	0.091	1,200
1,300	0.49	0.0775	0.0625	0.0625	0.098	1,300
1,400	0.50	0.0825	0.065	0.065	0.106	1,400
1,500	0.515	0.09	0.07	0.07	0.114	1,500

Practical tests of these bonds have been made on many of the leading railways, and the results verify the above measurements. In both Newark and Buffalo old rails have been utilized as feeders. For instance the Buffalo Railway Company has put down an insulated

feeder, 1,500 feet long, composed of four lengths in parallel of old high-carbon steel, tram rails, weighing about 50 pounds to the yard. These are connected together with the Edison-Brown plastic rail bond, and are carrying 1,100 amperes with a drop of but four volts. This remarkable performance shows that the plastic bond actually gives an electrically continuous rail. Another conduit, 1,800 feet long, with 14 similar rails in parallel is now being laid. The rails are worth little or nothing as scrap on account of their high carbon; insulation is secured by inclosing them in a strong wooden trough, and filling the space with a cheap insulating compound made from the refuse of petroleum distillation.

These four 50-pound rails with the plastic bonding evidently have a conductivity equal to a copper cable with $2\frac{1}{2}$ inches cross section. At this rate, steel is a far cheaper conductor than copper. Since these joints have remained under ground for over five years with absolutely no deterioration; since by the above method the pipes at Newark are maintained negative to the rails at any desired potential, and since the net result is a large saving to the railway, there seems to be no excuse for further destruction of pipes by electrolysis.

HAROLD P. BROWN.

Harold P. Brown was born near Chicago in 1857 of a representative American family. His pilgrim ancestor built the first separate dwelling house at Plymouth; three later ancestors were officers in the revolutionary war; another was distinguished in the war of 1812, while his father was made a brigadier general for bravery at the battle of Kenesaw Ridge during the rebellion.



HAROLD P. BROWN.

Mr. Brown prepared for the mining engineering course at Harvard but the great Chicago fires of 1871 and 1874 so crippled family finances that this had to be abandoned. From 1876 to 1879 he was engaged in the development of some of Mr. Edison's early electrical inventions. For the next five years Mr. Brown was in charge of the northwestern business of the Brush Electric Company and made many improvements in arc lighting machinery. In 1884 he started a successful business as electrical expert and equipped a laboratory in which were developed a number of inventions in electrical distribution and lighting.

Mr. Brown removed to New York in 1887 and made an investigation of the many fatal accidents from arc light circuits in the spring of the following year. In an article for a prominent New York paper was described a life protecting apparatus for such circuits which he gave free use to the public, but a reference to a new system

of current distribution as dangerous, caused a bitter attack upon him by the promoters who were then introducing it with the mistaken idea that it was harmless.

Mr. Brown then determined the danger points of the various types of currents by a long series of careful experiments at the Edison Laboratory and gave public demonstrations at Columbia college. As a direct result of this controversy the supposed harmless current was adopted for the execution of criminals in the state of New York and a very much higher standard of insulation was adopted for commercial wiring.

Mr. Brown has served as consulting electrical engineer for the state of New York, the board of health, the Edison and General Electric companies and many of the principal electric railways. He has spent some years in experiments at the Edison Laboratory in perfecting contact devices and finding a permanent remedy for the electrolysis of underground pipes and has co-operated with Mr. Edison in several inventions in this line. His system for this purpose is successfully used by a number of large railway power houses.

CARS FOR INTERURBAN ROADS.

Interurban roads have created a demand for a new type of car to meet the requirements of the new class of travel. Among the latest interurban lines are the Cleveland & Elyria, and the Akron, Bedford & Cleveland Electric Railroad Company, which have a magnificent territory near Cleveland. These roads have the best of everything in the way of machinery, equipment and construction, and have purchased from the Jackson & Sharp Company, Wilmington, Del., combination and passenger cars.

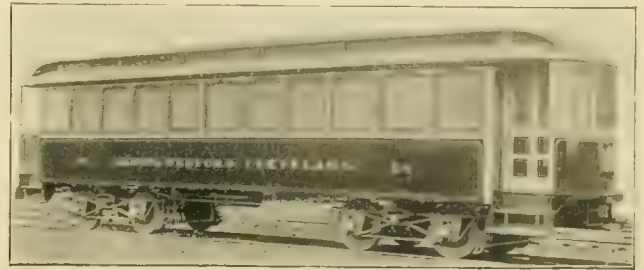
The combination cars are 32 feet 6 inches, over body, and 40 feet 6 inches over all, with baggage room 8 feet 6 inches, and 28 feet for the passenger end. There are 11 reversible seats and 4 corner seats, giving seating capacity for 30 persons. The seats are Bushnell No. 91 A, covered with common plush. Between



COMBINATION INTERURBAN CAR.

seats are electric push buttons, and the windows are supplied with Davis curtains. In one corner of the car is a saloon with hopper and water cooler. The interior finish is cherry with quarter sawed oak ceiling. The cars are supplied with Wood patent gates and iron railings on open end, double folding side doors on vestibule end, best bronze trimmings throughout, 2 De-

Witt sand boxes, Fulton foundry drawbars, lever hand brakes, double steps, gongs, bells, headlights, etc. The



INTERURBAN PASSENGER COACH.

passenger cars are 40 feet 6 inches over all, 30 feet body, 8 feet 4 inches wide, with 16 reversible seats and 4 corner seats, giving a seating capacity for 40 people. The remainder of the equipment is the same as on the com-



INTERIOR LATEST INTERURBAN CAR.

bination cars. The Cleveland & Elyria cars are olive green decorated, striped and lettered in gold. The Akron, Bedford & Cleveland cars are Aurora red trimmed in cream with gold decorations.

THAT TROLLEY BULLET.

Mrs. Emma Boyington, of Highland Park, was a passenger on the trolley car that was held up recently by highwaymen near Edgewater, this city. She occupied a seat next to T. P. Nisbett, who was shot through the leg by one of the robbers. At the time of the shooting, Mrs. Boyington felt a stinging sensation near her ankle, and also discovered that the bullet had passed through her dress, leaving a jagged tear. No trace of the bullet could be found. The other day Mrs. Boyington noticed that the silk underskirt which she had worn at the time seemed unusually heavy, and upon investigation found a bullet lodged between the folds of the lining. This is evidently the bullet that pierced Mr. Nisbett's leg, and the force of which was spent by the time it struck Mrs. Boyington's dress.

THE NEW ERA CAR.

Go away from home to get the news may now be amended to read,—and see the pictures. It seems too bad that our readers should miss the many works of art which appear in the electrical press in the land of the “don’t you know.” The illustration is taken from one of the brightest English journals and carries the inscription:

“ CONDUIT RAILWAY SYSTEM—SKETCH SHOWING MOTOR CAR AND GENERAL APPEARANCE OF TRACK.

The “general appearance” of the track is not so bad but from any such “motor car” as here shown—Good Lord deliver us! We call attention to the 16th century style of the car body and to the delightful Renaissance of the running gear architecture. The practice of placing the axle at the rim of the wheel instead of at the centre, as commonly prevails here is worthy of contemplation. The front dash has a decidedly austere appearance which doubtless renders fenders unnecessary, and the truck has an agricultural simplicity which none of our own makers have seemed to appreciate. The absence

But the most wonderful of all the new ideas is the step down transformers. By the use of these transformers, as will be evident at a glance, the riding public on entering the car instantly shrink to half size thus enabling the company to haul twice as many passengers as could be done on American roads. The exhaustless possibilities of the transformer would seem to instantly solve the no seat no fare problem and—there’s millions in it.

We feel somewhat aggrieved that our American friends should have gone across the ocean to make public any such radical departure as depicted for we can solemnly affirm they never had anything like this over here in the States. But after all there is some consolation in the symmetry of the outfit which does away with the “unsightly trolley.” On reflection we are inclined to believe the artist must have seen through a glass darkly—perhaps a whole jug.

FREIGHT AND EXPRESS SERVICE.

It seems too bad that millions of people are deprived of low priced freight and express service by means of



THE NEW ERA CAR.

also of brakes will save the motorman a lot of hard work. The elevation of the rear end of the car probably arises from the sudden stop just made. The elliptic form of the small guide wheels is due to excessive skidding on two sides, and we are not prepared to deny that the wheels are very cheap in first cost, being made of flour barrel heads. On account of the unusual height of the rear step passengers enter at the front platform.

Judging from her stature as compared with the others, the lady in l. f. e. must be one of the new women for the car has stopped to receive her and the motorman stands at “attention.” Nor should the delarte expression of the man with corns on his heels be forgotten among the numerous distracting objects of interest which this startling illustration contains.

street railways on account of some legislative act or some lapse in charters, because the original applicant did not have good foresight. Such a service does not injure anybody’s rights, yet many roads are prevented from enjoying its benefits, and increasing their accommodations to their patrons because some old law is in the way of progress. The latest case comes from New Jersey. An important company had made all its arrangements to inaugurate such a service, but the authorities refused to grant a permit. The city attorney had been delving into the past where he thought he found enough unchangeable laws to prevent the issuing of a permit, as such a service was contrary to provisions of the road’s charter and to an agreement that the road should not be used for any other purpose than to carry passengers.

POSSIBILITIES OF LONG DISTANCE TRANSMISSION FROM ELECTRIC OR STEAM PLANTS

Now that transmission at pressures of 5,000 to 10,000 volts has become an assured electrical success it is fitting for the electric railway engineer to inquire what bearing this new fact may have on his future work. It is not sufficient to the practical man to read of the possibility of transmitting large amounts of power long distances. He wants to know where and to what extent long distance transmission at high pressures is commercially profitable. Where water power is available it has already been demonstrated that such transmission can be made use of to a large extent with profit. However to the greater number of electric railways in the world, no water power is available, and the all important question is:—Can power be supplied to a large system covering much territory by high voltage transmission from one large central steam plant cheaper than by a number of small steam plants scattered over the district to be served?

The only way to determine with accuracy as to whether centralized or subdivided power is the cheaper, is to calculate every specific case. General rules can not be laid down which will cover all conditions. It will surprise those who have not indulged in such calculations to find how long a line of road with light traffic can be supplied direct from one power house at the usual 500-volt pressure. In order to give some idea of the commercial possibilities and limitations of high pressure transmission let us select a set of conditions which is likely to exist in the near future in several places. Assume that there is already in operation a large power plant supplying a city system, with machinery for the most economical production of power and with adequate provision for extension at a minimum expense. Assume now that fifteen miles away another division of road is to be built which will require a maximum of 300-horse-power. Will it be cheaper to build another power station to supply that division rather than transmit at high pressure from the big plant?

To enlarge the central plant so as to be able to deliver 300-horse-power at the substation trolley bus will take generators to a capacity of about 270 kilowatts which at the present price of about \$20 per kilowatt is \$5,400. The engines and boilers necessary to drive these generators (360-horse-power) at a price of \$50 per horse-power ready to run will cost \$18,000 more. Step up transformers at \$14 per kilowatt with a capacity of 270 kilowatts will cost \$3,780 and the step down transformers for the substation about the same. Rotary transformers for the substation for an output of 224 kilowatts at \$20 per kilowatt will cost \$4,480. If 5,000 volts pressure is used for the transmission line and the maximum loss when transmitting the full 300 horse-power is 10 per cent the

cost of copper for this line will be \$11,232 allowing 5,500 feet to the mile so as to provide for sag and assuming that the copper in place will cost 16 cents a pound. This is for a two phase circuit using four wires. A three phase system will take 25 per cent less. This loss of 10 per cent maximum in the lines will probably average for all day about 5 per cent as the average load on a substation of this size would be about half the maximum. With 5 per cent loss the interest on the investment in copper in this case approximately equals the cost of fuel lost in the lines under the conditions of power generation named later, and hence this is the most economical amount of copper. The cost of the long distance transmission plant according to the foregoing figures will therefore be as follows:

Steam plant at central station.....	\$18,000
Generators " "	5,400
Copper in lines.....	11,232
Step up transformers.....	3,780
Step down transformers.....	3,780
Rotary transformers.....	4,480
Sub station building, etc.....	1,000
Total.....	\$47,672

These figures do not include many details but for rough comparisons are probably sufficiently accurate. The pole line is not mentioned because existing pole lines would probably be used in such a plant

In making a comparison of operating expenses, the interest on the investment, loss of fuel in transmission, and wages of sub station men must be put against the interest on investment and wages of men in an independent plant. The force in the central station would probably not be increased by the addition of the transmission system. The interest is figured at 6 per cent in all cases. In calculating the cost of the fuel lost in transmission it is assumed that the central station employs simple corliss engines and develops an electrical horse-power-hour with 5 pounds of coal costing \$2 per ton. The average losses in transmission will be about as follows:—Line 5 per cent, step up transformers 2 per cent, step down transformers 2 per cent, rotary transformers 10 per cent, total 19 per cent. To deliver 150 horse-power average load to the trolley feeders at the sub station with 19 per cent loss requires 185 horse-power average at the central station. The fuel for the loss of 35 horse-power 20 hours a day will cost under the foregoing conditions \$1,177 a year. The sub station will require the services of two men, one for each watch. For comparison then the yearly operating expenses and fixed charges on the transmission system are as follows:

Interest on \$47,672 at 6 per cent.....	\$ 2,860
Cost fuel lost in transmission.....	1,177
Two men at \$60 per month.....	1,110
Total.....	\$ 5,147

Suppose now a steam plant is to be erected at the sub station location to do the same work. The small separate steam plant will cost more per horse-power than the addition to the large one. Assuming that it will cost \$10 per horse-power more than a corresponding addition to the large steam plant, 300 horse-power at \$60 per horse power will amount to \$18,000. Generators (224 kilowatts at \$20 per kilowatt) will be \$4,480. The cost of installing the separate plant is therefore:

Steam plant.....	\$18,000
Generators.....	4,480
Building, etc.....	3,000
Total.....	\$25,480

The yearly operating expense for comparison with such a plant is about as follows:

Interest on \$25,480 at 6 per cent.....	\$ 1,528
Two men at \$80 per month.....	1,920
Two men at \$50 per month.....	1,200
Total.....	\$ 4,648

Thus under the above assumptions the subdivided seems cheaper than centralized power generation. However the matter will bear a little closer inspection. In making these calculations it has been necessary to assume numerous conditions and a change in one or two of these may throw the balance on the other side. Thus if 10,000 volts were used instead of 5,000 there would be a reduction of three-fourths in the amount of copper required and the use of the three phase system would reduce this still more making a reduction of over \$500 in fixed charges on the copper investment. Then too if coal was cheap, say \$1 instead of \$2 per ton as it is in many places the loss in transmission in this case would be reduced over \$600 per year. This would make the centralized power production the cheapest.

The figures in this article are necessarily incomplete and include only a few of the most important items. There are a great many miscellaneous expenses such as oil, repairs, etc., that are not brought in because it has been assumed that they would balance each other in the two cases. There is however good reason to expect that such expenses would be less in the case of centralized power. It is also assumed that the economy of fuel is the same in the large and small plants,—an assumption not justified in all cases. The possibility of keeping an economical load on the machinery that is running is greater in the one large plant than in the two. There are other chances for economy in large plants that do not hold in small ones.

In spite of the modifications that the foregoing figures must undergo when applied to specific cases, it is evident that unless changes are made from any existing railway transmission practice conditions must be very favorable if a large interurban system can be operated cheaper by one large central steam plant transmitting power at high transformed voltages than by small steam plants in each

district. In any case the investment will be much greater for the transmission system, than for the small stations.

The great hope of the future is in the development of a successful alternating current railway motor. When that comes it is not unreasonable to hope that for interurban roads it will be possible to feed direct into the trolley line from commutatorless alternating current generators at a pressure of several thousand instead of several hundred volts and at this pressure feed direct from the trolley into commutatorless railway motors, without undue danger from burnouts and with a small loss in line and no investment in transformers. When that day comes there will be a tremendous widening of the field open to the electric railway and one station can with economy feed a greatly increased territory. It is also not improbable that a higher direct current voltage will in some cases be used for long lines and in this way the territory served from one power station may be considerably increased.

OFFICERS FOR PHILADELPHIA.

General Manager J. R. Beetem has announced the following heads of departments of the Union Traction Company: James Gorman, superintendent of transportation; W. S. Twining, chief engineer; Charles Hewitt, chief electrician; W. J. Kerr, superintendent of motive power; N. B. Nichols, superintendent of subways; S. T. Lincoln, superintendent of overhead construction; E. H. Shaufler and W. H. Wampler, superintendents of rolling stock; Nelson Sailer, claim agent; Walter Ellis, W. H. Whiting, Harry Miller, J. D. Benson, division superintendents.

THE PECK FENDER.

Among the most successful fenders tried at a test in New Haven, Conn., last summer, was one designed by Wilbur A. Peck, of the New Haven fire department. It



is mounted on a square frame, which can be removed from one end of the car to the other, and projects forward 3 feet 10 inches. When in position on the front of a car it is 6 inches above the track and is tripped by the motorman so as to come down on the track. On the forward end is a brass shoe that bears on the track when it is down.



STREET RAILROADING MELBOURNE

Our readers are again reminded that the most extensive cable system in the world is in Melbourne, Australia, a city which has suffered most terribly from the general depression of the past two years and which has lost largely of its population in consequence. Nevertheless the citizens have stood manfully by their splendid city, and none more so than the management of the Melbourne Tramways & Omnibus Company. The city still has over 400,000 population and has begun to feel the stimulation of better times. The fact then will be all the more surprising when we state the company by rigid economy was able to pay 5 per cent dividend and write a large sum to sinking fund account. By the courtesy of Assistant General Manager H. A. Wilcox, formerly of Providence, R. I., but for many years in his present position, we are able to give our readers an itemized statement of the cost of operation, an example we trust many will follow.

As the conditions in Melbourne are radically different from those in this country an explanation will prove not only interesting and instructive but will make the figures better understood. In the first place the operating company does not own its lines. They were built by a trust representing the different municipal councils through whose streets the lines pass, and were paid for by money borrowed in England on debentures issued by the trust. The charge for interest, four and a half per cent, and for sinking fund to repay these debentures, was made payable by the company to whom were given the leases of the lines for a period of 32 years, expiring in 1916. This charge for interest and sinking fund is practically a rent for the use of the lines, power houses and machinery. The payment to the sinking fund was to be at the rate of one and a half per cent for the first ten years, two per cent for the second ten years, and thereafter three per cent per annum until the accumulations covered the loans, which they were estimated to do before the termination of the lease. In this way, the lines, power houses, &c., would be paid for out of profits, and at the expiration of the lease fall into the hands of the municipalities without cost to them; thereafter, it was supposed, becoming a very valuable property for the municipal revenue.

In addition to these payments as rent the company was made liable to municipal taxation for the lines, but has successfully contested the principle on which the valuation for taxation should be made, and as the road is not making sufficient profit at present for a valuation, has not paid taxes the past year.

The company owns its rolling stock, car houses, and

everything necessary to work the lines except the power houses and machinery. Their payments therefore for debenture interest and sinking fund practically resemble the bonded interest paid in this country except that here when the bonds are wiped out the company owns the road.

In referring to his system of distributing accounts and charges Mr. Wilcox says:

"You will observe that we group our operating expenses under certain headings, which I will explain later. We include in that term everything except the payments to debenture interest and sinking fund and reserves for renewals. It is incumbent upon the company to hand over the lines at the end of their lease in good working order, and to meet the cost of renewing rails, paving, etc., which will be more heavy the later years of the lease than at present, we are accumulating a reserve for renewals, which of course comes out of profits, but cannot be considered operating expenses. Under operating expenses we group certain accounts, which for comparison with other tramway figures, especially those who use other forms of motive power, we bring together as motive power expenses, and these I will take first.

Engine house wages covers the wages connected strictly with the power houses and the machinery.

Fuel and wire ropes explain themselves, as do also oil, tunnel cleaning and tools.

Engine repairs covers the expense of repairs and maintenance of engine boilers and driving machinery at engine houses and pits in connection therewith.

Road gear repairs mean with us the maintenance of the machinery in the tunnels and pits away from the power houses, and are exclusive of surface repairs. As these items are all practically connected with cables as a motive power we group them together for our motive power totals.

Track repairs covers the maintenance of the surface of the track only, rails, paving blocks, crossings, switches, etc.

Car repairs.—The maintenance of cars, grips, rolling stock generally.

Wages covers the wages of the traffic staff, gripmen, conductors, signalmen, the inspectors, etc.

Sundries include keeping the surface of tracks clean, cost of tools used otherwise than in connection with motive power, repairs to buildings, lighting of buildings and cars, stationery and office expenses (excluding of course salaries), taxes, insurance, and the large number of miscellaneous expenses which cannot be allotted to

the other accounts. Management includes fees to directors, salaries of general manager and his assistant, secretary, line managers and clerical staff at head office.

Law costs includes compensation paid for accidents as well as for legal expenses.

Depreciation of leaseholds covers an amount written off each year from the cost of buildings, etc., on leasehold properties which the company loses at the end of the leases thereof.

I think with this explanation you can intelligently compare our accounts with those of American companies.

Under income we show traffic receipts by themselves, and group moneys received from advertisements, manure, rent, etc., as other income.

We figure our car mileage on the grip car and trailer as two cars, the grip car, closed car and trailer where the latter is run are treated as separate cars for mileage purposes. Usually we run only the grip car and one closed car attached.

For a clearer comparison with American expenses, perhaps I should say that we use what is called here "slack" or small coal, being the fine stuff which passes through the screens, and the cost is, say, \$2.52 per ton of 2,240 pounds.

MELBOURNE TRAMWAY AND OMNIBUS COMPANY, LIMITED.

Expenditures and Income, with Averages per Year to June 30, 1895.

FOR CABLE LINES ONLY	L.	S.	D.	AVERAGE PER CAR MILE. IN CENTS.
EXPENDITURE				
Engine house wages.....	11,533	8	7	\$0.0043
Fuel.....	1,289	18	3	.0012
Wire ropes.....	11,435	0	7	.0039
Engine repairs, oil, tools, tunnel cleaning, road gear, repairs.....	8,051	4	4	.0027
Total for motive power.....	41,032	12	11	.0141
Track repairs.....	5,506		9	.0017
Car repairs.....	17,201	18	1	.0054
Wages.....	81,330	4	0	.0257
Sundries.....	12,741	14	7	.0040
Manages.....	13,253	3	8	.0041
Law costs.....	2,696	17	3	.0009
Depreciation of leaseholds.....	1,540	19	8	.0005
Total operating expenses.....	178,341	6	2	.0564
Debiture interest and sinking fund.....	105,237	1		.0312
Renewal reserves.....	25,745	9	5	.0081
Total expenditure.....	309,323	5	7	.0957
INCOME:				
Traffic receipts.....	334,075	4	0	\$1.188
Other receipts.....	5,065	0	7	.0016
Total.....	340,140	8	1	\$1.194

Single car, miles run, 15,202,512.

	Percent.
Proportion of operating expenses to gross income.....	52.51
Proportion of fixed charges, i. e., debenture, interest and sinking fund and reserves to gross income.....	38.52
Proportion of profit to income.....	8.97

Our rates for wages are at present; gripmen \$9.60 per week; conductors, \$9.12 per week of 60 hours, that being the limit we are allowed to work gripmen and conductors under our parliamentary act. These rates are 25 per cent less than we were paying in 1890. Power house engine drivers with us get \$15 per week to \$16.80 per week and other grades of employment in proportion to the two mentioned. Employes other than gripmen and conductors vary in hours from 48 to 60 per week

according to their employment, the indoor men having generally the longer hours and the outdoor men the shorter.

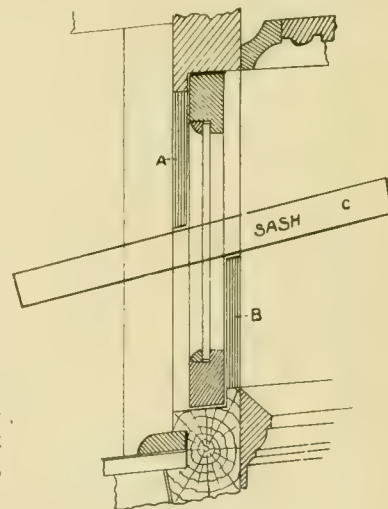
I have given these rates of wages, etc., in American currency and will give the car mileage similarly to save you the trouble of converting our rates into your money, but the expenses and receipts I give in English money.

As to speeds it may be interesting to you to know that we run several of our ropes at 12 miles per hour, others 11, but the bulk of them at 10, the latter of course through the busiest streets of the city, and find no difficulty in maintaining this speed through dense street traffic. This city, though having lost a good deal of population through bad times of the last four years, still exceeds four hundred thousand.

We have sixteen different trafficlines worked by cables and three small suburban extensions by horses. The schedule relates, however, only to the returns from the cable lines, the other portion of the business being very small."

DUST-PROOF DECK SASH STRIPS.

A patent has been applied for by G. E. Pratt, on an arrangement for a dust and waterproof deck sash. While something quite similar has been used in buildings, this seems to be its first application to street cars. The cut explains the device, which covers joints when sash is closed. Two strips are left solid on the side of the sash opening, one at B on the inside, and one at A on the outside and cut at centre to permit sash to swing into position C.



MORE POWER FROM NIAGARA.

The Niagara Falls Park and River Railway which now has a water power plant on the Canadian side of Niagara Falls is taking steps to sell some of the surplus power available at its station. The full available head is not made use of, but with slight alterations in the hydraulic plant, 20,000 horse-power will be available. This is, however, only a temporary arrangement as the Canadian Power Company has an exclusive power franchise and will in time develop power on the Canadian side commensurate with that on the American side. The Niagara Falls Park and River Railway operates at present nothing but its line of road from its plant. The idea is to sell power for other purposes until such time as the Canadian Power Company gets its plant in operation.

TRACK AND OVERHEAD DEPARTMENT— ECONOMICS.

BY J. W. GREER, SECRETARY AND GENERAL MANAGER, YOAKUM,
TEX., IMPROVEMENT COMPANY.

PART I.

The alleged "mistakes of Moses" were few compared to those which have been made in track and overhead construction during the brief period which has elapsed since the advent of the trolley; and the alleged "wealth of Croesus" dwindles into insignificance when compared to the vast sums which have been expended in trying to rectify those mistakes. No clearer demonstration of the money making power of the magic word electricity is needed than that illustrated by the fact that many roads which were successful as horse car lines have been wiped out down to the franchise, and new tracks, equipment and power plant substituted at enormous cost, and yet the net revenue in most instances is greater in proportion to capital invested than formerly. Add to the above the fact that within the brief period of seven years many of these roads have actually discarded their first electrical equipment as obsolete, and rebuilt their tracks and overhead systems (to remedy mistakes) thus nearly doubling the amount which it would have been necessary to expend had the requirements of electric traction been better understood, or the work more thoroughly done, and it becomes at once a matter of wonder that thus burdened with unnecessary debt, many of them not only survive but are actually able to declare dividends on the stock after paying the interest on the enormous bonded debt.

While the magic word "electric" (when the subtle power has been applied as a substitute for animal traction) always increases the gross receipts, yet there is a limit to its magnetic power (along this line), gauged by lack of population or dearth of attractions, and because of such limit many roads have been unable to adopt the radical measure of correcting mistakes by rebuilding and re-equipping.

As necessity is said to be the mother of invention the truth of the saying could not perhaps be better verified than by reviewing the efforts of an intelligent manager struggling to give first-class service with an antiquated electrical equipment over a miserable excuse for track, but such struggles have been made, are now being made, and to the heroic efforts of these we are indebted for many of the best points in track and overhead department economics.

The mistakes have not been confined to the earlier efforts at track and overhead construction or to roads backed by limited means, but have been equally as frequent in later years and among roads backed by unlimited capital. In the first instance the defects arose largely from false economy in constructing on too light a plan. Latterly the other extreme was reached and money lavishly wasted in a mistaken attempt to secure stability at the expense of flexibility. It is a long stretch from 25-pound T-rail to 110-pound girder and yet these have

both been advocated and used within the past six years as "the highest and best type" to be considered in track building for electric motors. It is equally as long a stretch from a six inch square pine pole with a wooden bracket arm projecting from it, to the huge and costly center pole of iron, with its concrete setting, and rigid "ornamental iron bracket" projecting from each side, and yet the writer has seen both in use, and knows that neither represents anything more than a waste of money and a lack of practical knowledge of overhead economics.

The amount of capital behind an enterprise be it ever so unlimited, or the net receipts be they ever so large in proportion to capital invested, never reach such proportions as to justify the needless expenditure of a dollar. For this reason if no other it is best to avoid the "specialty" business, in constructing, rebuilding or repairing electric railways.

Those of us who have been in the business of constructing and operating electric railways, since the beginning, early arrived at the conclusion that a T-rail track with the cross suspension method of overhead construction was the best practice, and in this opinion we are sustained with practical unanimity at the present day. We had watched the efforts of Mr. Van Depoele at Montgomery, Ala., and Mr. Sprague, at Richmond, Va., and it was evident that if electric traction was to be a success it would be on a track constructed for the purpose and never on such tracks as were in general use at that time for horse cars.

It was up-hill work and required a great deal of "nerve" on the part of a superintendent or manager to advocate not only a change in equipment and motive power, but the discarding of everything except the franchise, and rebuilding from start to finish, especially as there was nothing but the faith of said superintendent or manager to be used as an argument for the expenditure.

T-rail construction was selected and advocated as being the proper method for electric railways, because it was the cheapest and simplest and the details had been thoroughly worked out in steam road practice, so it was thought that but little, if any, experimenting would have to be done.

After all these points had been sufficiently impressed on the minds of the directors to cause them to loosen the purse strings, then began the herculean task of convincing the city fathers and the public that a T-rail track could be laid in the streets which it was possible to cross without the aid of a step ladder or an elevator. For the benefit of those who desire to use T-rail and are in doubt about getting the required permit, the writer will say that repeated trials have convinced him that it is cheapest and best, like the Irish sentinel, to shoot first and, if necessary, cry "halt" afterward. In other words, lay a piece of T-rail track "on the quiet;" lay it properly; then invite the press, the public and the powers that be, to inspect it, and no fear of the result need be entertained, unless, of course, you happen to be dealing with a set of statesmen who can only be convinced of the merits of any innovation after having been "approached." The writer

well remembers "introducing" something near a mile of T-rail between the hours of midnight Saturday and the same hour Sunday night. This was, perhaps, the first T-rail track ever constructed exclusively and specifically for electric railway purposes; certainly the first track ever built for an electric road in a town which had never had a horse car system.

Although Solomon didn't know as much as a last year's birds' nest when his knowledge is compared to that of the inhabitants of the town alluded to in regard to the disadvantages of T-rail, yet the work was done in such a manner that absolutely no interference was attempted and the remainder of the track was finished and is in use to this day. The streets through which the track was laid had been graveled to a depth of eight inches, so it was not necessary to haul ballast.

As no improvement has been made there upon the method of construction used at that time except to increase the weight of rail and substitute six-hole angle bars for four-hole fish plates, I illustrate in Fig. 1 a cross section through a tie showing a method of T-rail construction which time has proven to be cheap, simple, and effective from both the standpoint of the railway officials and the citizens.

It will be observed that the rails are spiked directly to the ties, that a plank eight inches wide and thick enough to fit snugly between the ball and flange of the rail is spiked with $\frac{3}{8}$ -inch boat spikes eight inches long, each



side of the rail, after being jammed with bars until a tight fit is secured. The rails are laid with broken joints and the planks likewise, but the joints in the planks are broken reverse to those in the rails. At the rail joints the planks are notched the full length of the angle bar, and just deep enough to press firmly against the nuts and heads of bolts, thus acting as an effectual nut-lock. Of course a spring washer nut lock is used on each bolt as it is put in. The ties are tamped up on not more than four inches of gravel, and not less than two. Too much gravel is as bad in track construction or repairs as too little. If too much is used it is impossible to tamp it tight, and the track will settle unevenly. If too little is used the track will not be properly drained and will go down in waves. Every shovel full of stuff taken from an excavation beyond the actual requirement is money wasted. Every load of surplus hauled off is equally a waste of money in most instances. If you lay a track in a dirt street, or one which has been graveled or macadamized, it is clear that if the excavation is made deep enough so that the top of the rail will be flush with the crown of the street before it was broken, the ties and rails will fill up so much of the excavation that it will be impossible to replace all the stuff taken from the excavation. Raising the crown of the street is the simplest,

cheapest and best plan to be followed in track economics, as less excavation is required and no surplus is left to remove. Two to three inches raise in the crown of a forty foot street is hardly perceptible to the unexperienced, and is sufficient to dispose effectually of all surplus in double track construction. To illustrate, let us say your rail is four inches high, tie six inches thick. You desire to tamp on three inches of gravel. Instead of excavating to a depth of thirteen inches, go down only the depth of tie and rail (ten inches). This will leave the top of the rail three inches above the original crown of the street. Cover the rails out of sight to a depth of two inches and slope off to each side gradually to nothing. If a steam roller is available wet the surface of the street and roll it down until the top of rail is visible. If a roller cannot be had let the track alone until vehicles have packed the surface to a level with the top of the rails. From five to six hundred dollars per mile saved in cartage and excavating is the usual result of the above practice, and a vast improvement in the drainage of both street and track accrues. If the matter is broached properly and the work done thoroughly no trouble with the city officials will ever be experienced as a result of the method described.

All rails either girder or T should be spiked directly to the ties whether laid in paved or unpaved streets. Any pattern of T or girder rail from 35-pound up can be successfully used in paved streets. When I say successfully I mean both from the citizens and the railway officials point of view.

We laid two blocks of 35-pound T rail across the main plaza of a western city more than six years since, through a block pavement. The cost of repairs to either the track or pavement has been practically nothing. We laid in the same city about the same time half a mile of 35-pound side bearing girder rail (narrow base) spiked directly to ties, and through the same kind of pavement, both are still in use but the T-rail track is in much better condition than the girder, although either is in better shape than much of the "shanghai" T and providence girder or other extremely tall heavy rail tracks, which I have observed in other cities. Of course the writer does not advocate at the present day the use of so light a rail as 35-pounds to the yard, neither would he advocate a useless waste of money in the buying of special patterns of extremely tall and heavy T or girder rails.

There are in the United States perhaps a dozen roads which would require a rail weighing 70 pounds to the yard. There is another dozen perhaps which would be best served by a 60-pound rail. But the other four or five hundred roads will be able to get along with a rail weighing from 45 to 56 pounds with perfect satisfaction.

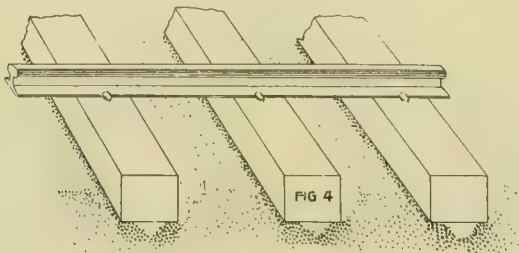
The writer's favorite size is a 50-pound T rail $4\frac{1}{4}$ inches high, joined with six-hole angle bars which fit so snug that it is necessary to drive them between the ball and flange of the rail with a hammer.

A concrete foundation is worth a great deal more to you under the pavement, then a heap of scrap iron will be after the ball is worn off the "special" rail. More

ties and less rail is the crying need of many hard looking tracks throughout the land.

If less rot were written about defective joints and more attention given to getting those you have tight, there would be dollars added to the net revenue of your road. If instead of howling for a heavier rail you would have the ties tamped properly under that which you have, the waves would disappear and accidents go down to a minimum.

To the manager who has never donned overalls and worked with the gang it seems that there is very little skill or brains required to do what he usually alludes to as common labor. He employs an engineer (of course he is first-class and understands his business because he charges a high price for his services) who tells him the amount of material, the proper kind, and makes specifications for first-class track, sets the stakes for curves and grades and does his work well. This is all right as far as it goes but if you don't know anything about constructing track yourself, hire a practical wide awake man who knows nothing of engineering, but understands the science of raising, tamping and lining track, one who

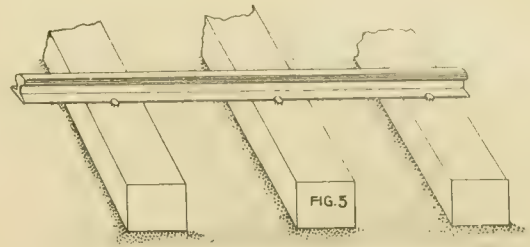


knows how to get a joint tight, and when a spike is driven straight. I repeat employ this kind of man to superintend the construction, for there are but few engineers who understand these simple practical matters and the time of that few is too valuable to devote to minutia.

A glance at Figs. 4 and 5 will show clearly why and how so much very poor track is constructed when plenty of the very best material is furnished. Fig. 4 shows the method employed by ninety-nine out of every hundred track foremen in tamping ties. After the track is raised the order is given to fill in for tamping. The space between the ties and almost level with their tops is filled with first-class gravel or broken stone. Then the men take a short handled shovel and work the gravel downward on an incline until enough has disappeared from view to allow an opening for tamping bars, the bars are then brought in play and the tie thoroughly tamped. Look at the end of the tie and you will observe that there is no gravel or other support whatever in the center of the tie, simply a pounded line two inches wide or less on each edge of the tie, and yet the old "railroad snipe," you have "bossing the gang" would swear by all the saints that the work was first class in every respect, and believe it too.

Look now at Fig. 5, observe that the gravel was filled in only to the bottom of the ties, then scooped out and shoved under the tie, with a long handled shovel, from

both sides until it met in the center of the tie. Then the bars were brought into play, the gravel rammed thoroughly and the tie tamped solidly throughout its length and breadth. This is a simple thing and yet it means

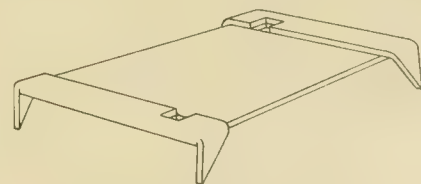


thousands of dollars saved in repairs to those who know and practice it; and a comfortable ride to their patrons.

If only four only inches of an eight-inch tie has a bearing it is clear that twice the number of ties would be required per mile to make a solid foundation than if the whole width of the tie rests solidly on the ballast.

A PRACTICAL TIE PLATE.

Even so busy a man as Julian L. Yale, the general sales agent of the Illinois Steel Company, occasionally finds time to do a little inventing and as might be expected when he does, the result is something extremely practical and valuable. Mr. Yale has long recognized the urgent need of a tie plate which would at once be simple and inexpensive. Moreover it must be a device which can be quickly placed and when in position can be depended on to stay where it belongs. Our illustration at once reveals the plan and utility of the plate, which is of rolled steel, weighing less than four pounds but distributing the rail load over a sufficiently large surface of the tie to prevent cutting into the wood with wear, and affording a smooth riding motion due to the increased solidity of the rail bearing. The plate has four sharp teeth, one at each corner which enter the wood to the depth of $1\frac{1}{4}$ inches, and by their arrangement and shape insure the plate from ever working loose. At the same time, if the track is taken up the plates can quickly be



JULIAN L. YALE'S TIE PLATE.

removed. Two spike holes are provided in the plate at diagonal corners so located that the shoulders of the plate protect the spike from being worn by the rails, thus lengthening the life of the spike-hold very materially. The plate also prevents water from working into the tie at the spike. The plates are made to fit any desired rail base. Prominent railroad men both steam and street, who have seen the plate speak very highly of its advantages and utility.

CITY MUST FIND FENDERS.

Justice Neu, of Brooklyn, has given the most important fender decision of record. He has overthrown the ordinance requiring fenders on cars, because it is unreasonable and impracticable. He said the burden of proof was on the city to show that at the time of the passage of the ordinance, and within 60 days thereafter, there existed a device, or fender, which would do the work required of it by the ordinance. This removes from the company the necessity of looking for fenders, as it compels the city to seek out and bring to the company the device that it shall use. The Court continued:

"Furthermore, the evidence of all the experts produced went to show that none of the fenders exhibited on the trial and which were in existence at the time of the passage of the ordinance, and within sixty days thereafter, could be run attached to the front platform of a car, and extend to within three inches of the rail without striking the ground when the car oscillated. The evidence being that said oscillation was from four to eight inches while the car was in motion depending to some extent upon the number of passengers in the car and the rate of speed at which the same was running, and that no fender so attached rigidly to the platform of the car would do the work required of it by said ordinance, because, by striking against the rail the invariable result would be the destruction of the fender, and if not rigidly attached to the platform, the tendency was that the fender would pass over a body or obstruction and allow such body to go under the wheels of the car.

"That an ordinance should be passed that can be enforced, and that devices do exist which will do the work required of the fender, I have no question, but it is for the Common Council to pass such reasonable ordinances as can be complied with by the company, and when that is done the courts will undoubtedly enforce it.

"I am of the opinion, however, that no device is in existence, or can be made, which can run within three inches of the track. All the evidence on this trial was to the effect that a device attached to the front platform of the car in order to save life or attain the results which said ordinance was passed to accomplish, could not be run safely nor with the proper effect at a distance less than six inches from the rail.

"Judgment is therefore rendered for the defendant on the merits, dismissing the complaint, with costs."

Assistant Corporation Counsel Yonge, who had prosecuted the fender suits, said that the decision was just what he expected.

However another effort is making to pass a fender ordinance which will stick and the following, to which is attached a penalty of \$100 per car per day for violation gives the substance of the bill.

On and after the first day of January, 1896, every car operated by electric power upon the surface railroads in the City of Brooklyn shall have attached thereto a fender in front of the front platform of said car, which shall be deemed to be the platform at the end of the car in the direction in which such car shall be traveling. Each of such fenders shall be not less than five feet in width and of such

construction and so attached that it will project from a point (four inches or thereabouts from the dashboard and six inches or thereabouts higher than the floor of said platform), outward not less than four feet and down to within eight inches or thereabouts of the rails, and the body of said fender shall consist of rope, wire, rubber or other flexible netting. And that on and after that date no surface railroad company in the City of Brooklyn so operating its cars by electric power shall operate any of said cars upon any street or avenue in said city without a fender attached thereto in the manner and of the kind and character above provided.

INCREASING SEATING CAPACITY AT PITTSBURG.

The Duquesne Traction Company of Pittsburg has been experimenting with a device for increasing the seating capacity of its closed cars. The accompanying engraving shows the appearance of the car equipped with these seats. The extra seats are put on spindles



between the regular side seats and tilt up edgewise automatically when not being sat on. The seating capacity of the car which is usually 22 is increased by these seats to 40. Although at first sight the scheme may not favorably impress street railway men, E. McDowell, superintendent, reports that the patrons of the road seem highly pleased as it is not only convenient but adds to the appearance of the car. It seems to work well in practice. In one respect it is certainly a direct benefit, viz:—it allows no passenger to take up more than his share of a seat. The Milner & Wolcott Company, of Canton, Ohio, exploits the device.

STREET RAILWAY LAW.

EDITED BY FRANK HUMBOLDT CLARK, ATTORNEY AT LAW, CHICAGO.

Injury to One Crowded off the Platform of Car.

In an action for personal injuries against a common carrier, when the plaintiff's injury does not result from any accident to the train, or from any defect in the means of transportation, the burden of proof is throughout on the plaintiff to show his injury was the result wholly of the defendant's negligence.

Where a passenger on the conductor's invitation boarded a car but could not get inside because of the crowd, was compelled to stand on the platform and was finally pushed off the car by the crowd and injured, it was held that the defendant was not liable.

The opinion by Dean, J., is as follows:

"The defendant operates a narrow gage railroad running about seven miles out of Pittsburgh. On the 18th June, 1893, defendant, to accommodate a German society in an excursion to West Liberty, on the line of its road, ran excursion trains to that point from Carson street in Pittsburgh. The route was up an incline railway from Carson street to summit of a hill, then down an incline operated by a cable, 1,3000 feet, to foot of hill on other side where the cars were attached to a locomotive which took them to West Liberty. The plaintiff, with his son and a friend, took passage at Carson street, ascending the incline, then got off to enter the cable cars to descend to the level. Here there was a large crowd of people all as usual on such occasions, eager to enter the cars; there were two trains scheduled to start ten minutes apart, of four or five cars each, standing ready; plaintiff and his son and friend got upon the rear platform of the first train; the car was very full of passengers; the train started and had moved but two or three hundred feet when plaintiff was pushed and fell to the ground, dislocated his elbow and sustained other injuries which have seriously disabled him. He brought suit against defendant for damages, alleging the fall from the car was in consequence of its negligence in so crowding the body of the car with passengers that he could not get inside, and in crowding the platform after he was upon it so that he could not get off before starting or maintain his place upon it afterwards. There was a verdict and judgment for plaintiff, from which defendant appeals, assigning for error the refusal of the court on all evidence to direct a verdict for defendant.

"The court instructed the jury that if plaintiff got on the platform when he saw the car was so crowded he could not get in; or if having got on, and then, before the car started, saw its crowded condition, but did not get off; or without any necessity for so doing remained on the platform after the car started he could not recover. But appellant alleges there was not sufficient proof of any negligence of defendant, while the proof was undisputed of contributory negligence on part of plaintiff. Undoubtedly, as the injury did not result from any accident to the train, nor from any defect in the means of transportation, the burden of proof throughout was on plaintiff to show his injury was the result wholly of defendant's negligence. He was standing in a known place of danger, one not

intended for passengers, after the car started, and then fell or was pushed off. In other words, there are no presumptions in his favor or against the defendant. How came he to be in a place of danger where he had no business to be? His place was inside the car, not on a crowded platform. The plaintiff, his son and his friend Shantz, undertake to account for this otherwise manifest negligence in substance thus: 'He got off the car when it reached the summit of the incline; the two trains were standing there and about them was a large crowd; in looking for a car to enter, the three passengers were separated; the son got to the rear car of the first train; the conductor was standing by it and said 'there's lots of room inside here; this train is going out right away.' He immediately found his father and Shantz, repeated what the conductor had told him, and they all got on the platform to get in the car, but at the door found it was so crowded, they could not push their way in; then, others so crowded up behind them, that they could not get down from the platform. The car started and the conductor, who was on the platform, immediately began taking up the tickets; one passenger, by his ticket, was on the wrong car, and the conductor commanded him to get off and commenced pushing the passengers on the platform aside to enable this man to get down the steps, when plaintiff was pushed off backwards through the opening in the platform railing and injured. There was much evidence to contradict this statement of the fact, but still there was sufficient testimony to warrant the jury in finding it to be true. If true, the plaintiff, through the invitation of the defendant, was in a place of danger from which he could not extricate himself without risk of greater danger; then, by the rude manner of defendant's agent, he was jostled or pushed from the car. He was on the platform of a crowded car by fault of defendant, and was pushed therefrom by fault of defendant. The testimony of defendant that the car was not crowded; that, if crowded, it must have been obvious to plaintiff before he got on the platform; that the conductor did not invite passengers to get on after it was reasonably filled; that he did not rudely push or jostle those on the platform, was all submitted to the jury by the learned judge of the court below in a charge which, while just, was quite favorable to defendant. That was the end of the court's duty and is the end of ours."

(Supreme Court of Pennsylvania. *Dennis vs. Pittsburgh and Castle Shannon Railroad Company*, 15 Pittsburgh Legal Journal, 354.)

[In a recent case in Nebraska it was held that a street railway company is presumptively liable for the concurrent negligence of its servants and third persons resulting in personal injury to a passenger. Also that a passenger is not guilty of contributory negligence *per se* in standing on the front steps of a crowded street car in motion preventing his recovery for injuries received in consequence of being crowded off through negligence chargeable to the company.—*Pray vs. Omaha Street Railway Co.*, 62 Northwestern Reporter, 447. Ed.]

Collision with Train—Not the Duty of Street Car Passenger to Discover Train.

A passenger on a street car is not guilty of contributory negligence in failing to exercise any care to discover an approaching train on a railroad track crossed by the street car track.

(Supreme Court of Texas. Gulf, etc., Railroad Co. vs. Pendry, 29 Southwestern Reporter, 1,038.)

Pedestrian Approaching Track—Duty of Gripman.

A gripman of a street car is not obliged to stop or check the car on seeing a pedestrian approach the track, where no danger of a collision is apparent; and such duty does not arise until it becomes apparent to one of reasonable judgment that such pedestrian has placed or is about to place himself in a situation of peril.

It is the duty of a gripman of a street car, upon seeing a pedestrian staggering and apparently not knowing what he is about when within five or six feet of the track upon which his car is approaching, to at once take precautions to prevent a collision.

(Supreme Court of Missouri. Bunyan vs. Citizens' Railway Co., 29 Southwestern Reporter, 842.)

City Ordinance—Provision as to Speed—Change to Electricity.

A provision as to speed, in a city ordinance requiring street railway cars to be drawn by horses or mules only at a limited rate of speed, is not repealed by a subsequent ordinance authorizing the substitution of electric cars, and requiring the company to comply with all ordinances previously or subsequently passed "relating to the rate of speed."

(Supreme Court of New York. Martineau vs. Rochester Railway Co. 62 New York State Reports, 722.)

Collision With Wagon—Driving at Prohibited Rate of Speed.

A street railway company is not liable for injuries to passengers in a wagon, caused by a collision with one of its street cars, where the driver of the wagon was at the time driving at a prohibited rate of speed, and the accident would not have occurred if he had observed ordinary diligence.

(Supreme Court of Georgia. McGrath vs. City and Suburban Railway Co. 20 South Eastern Reporter, 317.)

Imputed Negligence of Fireman on Hose Cart—Care Required of Driver of Cart.

Negligence of the driver of a hose cart is not imputable to a fireman riding on the cart.

Knowledge by the driver of a hose cart, that a street car company has promised to repair the track at a specified place, is a circumstance to be considered by the jury in determining whether he used proper care in attempting to cross it; but his reliance on such promise cannot defeat the defense of contributory negligence if he failed to exercise due care in endeavoring to cross the obstruction.

(Supreme Court of Texas. Houston City Street Railway Co. vs. Richart, 29 Southwestern Reporter, 1,040.)

Crossing of Railroad Track—Duty to Maintain Watchman.

In the absence of statutory or municipal requirement a street railway company is not bound to maintain a watchman, flagman, or guard at a crossing by its line of railway tracks.

(Supreme Court of Missouri. Jacquin vs. Grand Avenue Cable Co., 57 Missouri Appellate Court Reports, 320.)

Injury at Crossing—Sounding Gong—Rate of Speed—Duty of Driver.

The sounding of a gong for a considerable distance on the approach of a motor car to the junction of two streets is a sufficient warning to travelers, in the absence of a statute requiring other or different signals.

Speed not exceeding 4 or 5 miles an hour is not an unusual, excessive, or dangerous rate for a motor car upon a city street.

A driver is guilty of contributory negligence in failing to discover the approach of a street car, where at a point a few feet distance from the track he has an unobstructed view of the track for 200 feet, although his view immediately before reaching it is obstructed.

(Supreme Court of New York. Van Patten vs. Schenectady Street Railway Co. 62 New York State Reports, 378.)

Validity of Ordinance—Regulation of Time of Running Cars.

An ordinance of a municipal corporation requiring the railway company operating lines of cars in the streets to run their cars during certain periods of the day at designated intervals is valid as against a railroad company the charter of which provides that the line is to be constructed only with the consent of the municipal authorities, who are thereby authorized to regulate the time and manner of using the same.

(Court of Common Pleas, New York. 31 New York Supplement, 147.)

CHANGE FROM STEAM TO ELECTRICITY.

A correspondent asks: "Can a regularly incorporated railroad company running by steam locomotion change its motive power to electricity?"

In some states, as in Illinois, the statute governing the incorporation of railroads gives the corporation power among other things "To receive and convey persons and property on its railroad by the power or force of steam or animal or by any mechanical power." Starr & Curtis, Annotated Statutes of Illinois, Page 1914. In such states a steam railroad would be authorized to change its motive power to electricity. And in general, where no provision is made on the subject, unless the statute of the state or the charter of the company expressly limits its power, a steam railroad company may change to electricity.

Car No.

189

Inspector.

MOTORMAN'S REPORT.

Car No.

189

TOOK CAR AT	M	M	M	M
Brakes				
Controllers				
Lamps, Oil				
Lamps, Electric				
Light Connections				
Gates and Guards				
Motor No. 1				
Motor No. 2				
Gears				
Pinions				
Oil Cups				
Fuse				
Brushes				
Trolley				
Arrester				
Hot Box				
Curtains				
Line Trouble				
Track Trouble				
		Trailer No.		
Light Connections				
Lamps, Oil				
Lamps, Electric				
Guards				
Curtains				
LEFT CAR AT	M	M	M	M

NOTE—Mark "O K" or "B O" and fill in time of taking and leaving car, and sign in same column. Explain on back of report if necessary. Each motorman to fill out and hand to his relief, last man to put in box at yard.

Sign Here.

Each car as it passes the inspector's station is looked over by him, and the time, motorman's name and the condition of the car entered on his "inspector's report" sheet, reproduced herewith. It will be noticed that the inspector keeps a sheet for each car, and that a line is provided for entering each trip. So much for the inspector's duty. With no check on his reports it would be an easy matter to neglect duty; but right here the motorman's report comes into play. As shown in the accompanying blank, each car has a full daily report made out by the various motormen who may have charge of it. Each motorman has a column in the report which he signs at the bottom before turning it and the car over to the next man. The barn men look over the motormen's and inspectors' reports every night, and work accordingly. Now, it is evident that neither motormen nor inspectors can be negligent or careless without every chance of detection. If an inspector fails to note defects it is discovered by reference to the motorman's report, and vice versa. The motorman and inspector being held responsible for discovering defects, dare not omit to mention anything found out of order. Collusion in a matter

of this kind, where a car is reported upon by so many men in a day, is practically impossible.

A further check on the reports is the time-sheet of the night men in the barn. The night men turn in time-sheets showing exactly what they have been working on and how long a time was spent on each job. This not only, in a measure, prevents loafing on the part of night men, but shows up any omissions in inspectors' or motormen's reports. For example, if a barn man reports that he spent two hours fixing the trolley on car 21, and the inspectors' and motormen's reports show that the trolley on car 21 was all right, it is evidence that somebody is at fault, and there is need of an investigation. There is also another useful feature about the system. Motormen after an accident sometimes lay it to a defect in the equipment. The most common example of this is a careless collision with a wagon, and an explanation by the motorman that the brakes were out of order and had been for several days.

The reports leave motormen no such loop-hole of escape, as they put the men on record as to the condition of the cars each day. If serious defects appear, the orders are to run the car to the barn. When cars are run to the barn for repairs, the foreman makes out a blank, giving car number, motor number, time of day, cause, and estimated cost of repair. Under the head of cause the simple entry "carelessness" is sometimes made, and the case investigated further. Not only is the system useful as insuring proper attention to apparatus on the part of the men, but it also traces back troubles to their beginnings, so that they can be intelligently investigated by the superintendent. As one trouble sometimes leads to others by an unlooked-for chain of events, a record kept in this way by the men who handle the cars every day often reveals sources of troubles that the repair department, unaided, would be a long time in discovering, because it has no continuous record of car troubles.

For example, hot armature boxes cause burnouts on the heads of armatures. Now, while this fact might be well known, the chances are that with a continuous record of a car's troubles the cause of such burnouts would be perceived very soon by an intelligent man looking over the reports, whereas, on the other hand, it would take a long time definitely to locate the chain of cause and effect were no such records kept.

TO CONDEMN RIGHT OF WAY IN CITY.

Condemnation proceedings have been begun by the Chicago General Street Railway Company to secure right of way inside the city limits. The company will build two miles of track abutting on Thirty-first street, and has begun proceedings to condemn the 25 feet adjoining the north street line from Kedzie avenue west to the city limits. The lots all front east or west, so the company is after the corner lots. C. L. Bonney, vice president of the company, says it will be cheaper to

secure right of way in this manner than to buy a franchise in the street. The general ordinance of the company gives it the right to cross streets to connect the lines that may be built on the condemned land. Some interurban roads have private right of way, but this is the first case that has come to our knowledge of a city road trying to secure a private right of way for any considerable distance. The action, if successful, will add 25 feet to the width of the street. If it is determined to fence in the tracks, fast time could be made between streets.

DETROIT RID OF HORSE CARS.

With impressive ceremonies electric cars took the place of horse cars accompanied by a dismal rain on November 8th, on the lines of the Citizens Railway Company, Detroit. Many months ago Tom Johnson promised the people that before winter snows would fall there would be an end to the horse railway system in Detroit, with a much more speedy method of transit in its place. Since this promise was made a large amount of work has been done, new tracks laid, and a new power house constructed, which has been so rapidly and so well done, that Mr. Johnson kept his promise several weeks in advance of the snow. Each side of the car was concealed by a sign reading "The last horse car." At the city hall a number of invited guests boarded it, while Mayor Pingree and other officials gazed out of the window. The car proceeded to the offices of the Citizens' company, where



Vice-President Hutchins, Manager DuPont, Superintendent Grant and Secretary Peters were waiting with a band, which started ahead of the car back towards the city hall. When the city hall was reached, the band played "Johnny Get Your Gun." Mr. Hutchins made a speech, and the car was hitched to a motor car to be hauled over the lines. On the return trip the guests were permitted to take souvenirs, so that when the car reached the Jefferson avenue barns, it was minus windows and everything movable, even a part the roof being torn off. Still the guests were not satisfied, so axes were furnished by the company for the completion of the work of demolition. The illustration which is reproduced from the Detroit Free Press by the permission of the management, shows the car with the city hall in the distance. Mayor Pingree is looking out of one of the windows.

FIRE CHIEFS RESOLVE.

The International Association of Fire Engineers at its convention at Atlanta heard the report of a committee on the trolley system which is summed up in the following points at its conclusion:

"Your committee would most earnestly impress on the mind of every fire department chief the immediate necessity of prompt action on the part of town and city authorities in this all-important matter, and of directing their attention to the following points:

First—Have determined at once whether the rapid corrosion of the water pipes is going on, due to this cause, and to what extent.

Second—To take immediate steps to stay its progress.

Third—Use all your influence in preventing companies and individuals from procuring a franchise to build and operate electric roads equipped with the overhead single trolley system.

Fourth—Serve the community, and protect yourselves, by warning those in authority that the water system may fail you at a most critical moment and completely paralyze your efforts to stay the progress of the flames.

Fifth—That gas pipes are becoming so weak from this cause that they will pour their contents into the soil, dwellings, stores, warehouses and factories, to such an extent as to endanger these structures and the lives of the inmates as well.

Having done all this, you will have performed your whole duty; and if your note of warning is not heeded, the responsibility for possible future disaster will rest on the shoulders of those who blindly invited it.

CAPTAIN WM. BROPHY, Boston, Mass.
JOHN P. BARRETT, Chicago, Ill.
MORRIS W. MEAD, Pittsburg, Pa.
B. S. FLANDERS, Boston, Mass.

Committee.

The report of the committee was accepted and received a unanimous indorsement."

As to the first two points we have no adverse criticism to make. The matter should indeed be investigated in cities where it has not been done already, and steps taken to prevent any liability of electrolysis. We think the majority of railway companies will be perfectly willing that such investigations be made, as it is a matter of economy to them to remedy the evil if it exists. However the second point is an admission in itself that with proper precautions there is no danger, and hence the last remaining three points are entirely unnecessary, uncalled for, and calculated to raise an undue apprehension as to the dangers which exist. Nothing but the certain knowledge that electrolysis is an evil that can not be prevented by any means should justify a recommendation that all applications for franchises be opposed, and the report itself shows that the committee does not really believe this. Furthermore it would look much better if Mr. Barrett, of Chicago, who is the consulting engineer for a company promoting a conduit system would keep his name off a document which recommends opposition to the trolley system under guise of the interests of the fire departments. But then nothing better in the way of professional honesty is to be expected of the man who as chief of the World's Fair electrical department allowed electro-medical fakes in the electricity building, or who as a prominent officer of a certain electric railway construction company virtually sanctioned one of the most miserable return circuits of which we have known. Such a public necessity as the trolley system is not going to be forced out of the field by such tactics.

"A RECORD OF ONLY BRILLIANT FAILURES."

A remarkable circumstance attending the exploitation of storage batteries for street cars has always been the tremendous success the "bats" are making somewhere else. It's like the old farmer and his ague "Not much 'bout here, but down the crick a spell they hev it powerful bad."

And so the fairy tales of the storage in Paris and elsewhere serve to keep alive what little interest remains in storage for street cars. The following, therefore, from the "Railway and Tramway World," London, the leading authority in such matters on the other side, will be noted with deserved attention.

It says editorially, last month:—"Verily the fascination of the electric accumulator system is great. Time after time, in London and New York and in a dozen lesser cities, experiments with the accumulator have resulted in absolute failure, and in Birmingham, where the Central Tramways Company have kept up the accumulator service because they have had hitherto no feasible method of escape, there is a standing warning that this way lies nothing but loss. Yet the accumulator never lacks new recruits, and in view of its obvious convenience it is, perhaps, not surprising. The latest accession to the ranks of experimenters is the Hanover Tramways Company, who are about to substitute accumulators on 28 of their electric cars for the overhead wire system. No details of the batteries accompany the intelligence, but they are to be supplied by the Hagen Accumulator Company, who have the usual confidence in the staying-power of their accumulators. But it must be a bold tramway company which at the present stage ventures to discard the well-tried and profitable overhead system for a method which has at best a record of only brilliant failures. The Tramway World, at least, while it may admire the courage of the Hanover Company will be more inclined to sympathize with the Birmingham Central Tramways in their efforts to induce the local authorities to allow them to replace accumulators by the more economical overhead system."

DIRECT CONNECTION AT WINNIPEG.

The Winnipeg Electric Street Railway Company, Winnipeg, Man., has installed a new plant, consisting of a 1,000-horse-power cross compound condensing Corliss engine, direct connected to a Canadian General Electric multipolar generator. The engine is 18x34x42. The generator is compound wound. The old power plant consisted of a cross compound Wheelock condensing engine, driving three Edison belt-driven generators of 150 kilowatts each. During the summer an average of 34 cars were operated. The company has 16 miles of track. E. H. Campbell, general manager of the company, is quite proud of his new power plant, which has been built so there is room to install another 1,000-horse-power unit and boilers.

HEATING OF CARS.

Heating of cars so as to give satisfaction to passengers, to city authorities and to the company itself is a problem that has not yet been solved by all managers. While there are many effective heaters on the market, it is difficult to satisfy everybody. One passenger says it is too warm in the cars. He doesn't see the necessity anyway of heating cars. His next neighbor will find the car too cold. He would like it about 98 degrees, so he could wear summer clothes the year round. Other passengers in the same car find it comfortable.

There must be some reason outside of the car itself for these diverse opinions, for the temperature registers about the same in all parts of it. The only points of difference are the sensations it causes in the passengers, who if they would examine into the causes closely would find that the fault, if there be any, is in themselves. The warm passenger may be quite warmly clad and used to exercise. He is in good health and his well nourished blood rushes briskly through his veins giving out warmth. His garments are designed for out of doors, so that he is uncomfortable even in his own house. The cold passenger is perhaps thinly clad, or may be sedentary in habits, which makes the blood thin, and the man sickly. The other type is the healthy man who is dressed comfortably, so of course he feels satisfied with the temperature of the car.

A very easy way of determining just how many people desired unheated cars would be to run an occasional car, say every third, bearing the sign

THIS CAR IS COLD.

By this means the manager can quickly feel the public pulse.

There are yet a few benighted managers who do not believe in heating any of their cars. Such would do well to put in a few good heaters and then along in the good snug winter days of January prayerfully study the comparative receipts of their heated and cold cars. It would be an object lesson the most cold blooded manager could not fail to comprehend.

NEW DEAL IN CHICAGO FRANCHISES.

When Chicago's mayor returned from his junketing trip to the Atlanta Exposition, his mind was invigorated, so that it was fertile in resource, for he made the Chicago City Railway pay \$55,000 for a franchise to operate cars by electricity on Clark street from Adams to Washington, four blocks, with \$25,000 additional for the franchise to adopt electric traction on the Clark street line. The Calumet Electric Company was given a franchise for 16 miles of tracks for \$50,000, payable as follows:

Five annual payments of \$1,000, beginning December 1, 1895; five of \$2,000, beginning 1900; five of \$3,000, beginning 1905; five of \$4,000, beginning 1910. This is the first time any semi-public corporation has been obliged to pay the city for its franchise.

THE RECORDING WATTMETER ON CARS.

Every electric road has, or ought to have, an ammeter and voltmeter for making car tests. The use of the recording wattmeter for car tests is by no means as common. The recording wattmeter if of reliable make is however an instrument of great value for certain classes of tests and indeed it is almost a question whether if these instruments can be made to stand continuous service on a jolting street car and can be furnished at a reasonable price, it will not pay to put one on every car. The advantages of such a plan are obvious. The wattmeter furnishes a continuous record of the performance of every motorman and the car he has charge of. If there is anything wrong with the motor the wattmeter will tell it and if there is anything wrong with the motorman the wattmeter will so report. The superintendent does not need to rely on the way his motormen act when he is around because the wattmeter "never sleeps." It is a spotter of the bad men as it is also a spotter of the good men that are worth retaining. The wattmeter system would also solve one of the most troublesome problems that has come up in the work of assigning cars to motormen. It is the custom on many roads which have a surplus of rolling stock, to give each man a car and hold him responsible for the repairs needed on his car. In order to make the best use of the rolling stock, however, it is necessary to run two or three crews on a car in a day so as to obtain a large mileage from each car. Having two motormen run a car of course prevents any fair judgment as to the merits of the motormen as taken from the repair bill because one man's carelessness may more than compensate for another man's care. With wattmeter readings taken at the end of each motorman's daily run the efficiency of each man can be found with very little trouble. The practicability of this idea of course depends on the cost and durability of car wattmeters. We merely throw this out as a suggestion of a plan which is worth experimenting with and which has prospects of giving good results.

CAR BUILDING AT CINCINNATI.

The Cincinnati Street Railway, of which John Kilgour is president, has decided to build its own cars, for its consolidated lines.

Extensive works are contemplated, the entire plant being intended to occupy 16 acres at Spring Grove and Mitchell avenues and the C. H. & D. tracks. Ten acres also are to be improved as a pleasure resort. Contract for the paint shop has already been let for \$35,000 and other structures are to cost \$100,000 including repair and erecting shops, cabinet shop; an engine and boiler room 120 by 140 feet; varnish room 50 by 150; car house supply depot 120 by 205; armature shops 55 by 120; machine shop 120 by 220; and blacksmith shop 90 by 120. Several hundred workmen are to be employed. It is not now the intention of the company to build cars for the trade.

SUNDAY STREET CARS.

Some Canadian cities are greatly agitated over the question of running street cars on Sunday. In most cities Sunday is observed by the shutting down of all kinds of business, including saloons and barber shops, and there are a few places where the street cars are not operated on that day. The legality of this question will be tested at the Wentworth assizes. John Henderson, of Hamilton, Ont., has presented a petition for an injunction restraining the Hamilton Street Railway Company and its employes from operating cars on Sunday. It is proposed to make a test of the case, which will be carried to the court of last resort. It is understood that Henderson represents the Ontario Lord's Day Alliance.

Managers throughout the Dominion are greatly interested in the outcome of the case. Some of them are anxious to run their cars every day in the year, but are hindered by local legislation. The majority of the people demand the service, while those who are opposed would not patronize the cars anyway, so that their opposition ought not to count. In a certain Canadian city, the citizens almost to a man petitioned the manager to operate his system on Sunday, even going so far as to have the city council pass an ordinance permitting the cars to run. The manager in spite of all this pressure refused to operate his cars, giving as his reasons, that he didn't believe in Sunday work, wouldn't work on Sunday himself, and would not compel his employes to work on Sunday. So the people have to do without the cars.

A country editor who visited Toronto one Sunday published these observations in his paper:

"Well, I saw some sights on Sunday afternoon that set me thinking. In the first place I saw individuals and families out riding in every kind of vehicle that could be made to carry passengers. From the carriages, landaus, Victorias and surreys of the rich down to buggies, express wagons, grocery wagons, and pony carts of the humbler classes. Every available rig and turn-out was made to do duty for the conveyance of young and old around and outside the city. The poor grocery wagon horses; that had to be going until midnight or after on Saturday night, were heavily laden with human freight on Sunday afternoon and evening. If the street cars had been running these poor tired horses could have had a day of rest, while ten times the number of people might have enjoyed the pleasure of a ride, seen the city and sniffed a mouthful of fresh-air, with less of what is called "Sabbath breaking" than is caused by the largest possible use of private conveyances.

"But I saw in the over-crowded parts of the city where the poorer classes most do congregate what impressed me most in regard to this matter. To see the crowds of these people, old and young, huddled together in heaps, when but for mistaken ideas of Sabbath sanctity they might have had an afternoon's outing in the suburban parks, breathing great mouthfuls of fresh air, worshipping God in His works as seen in the great temple of nature, and getting refreshment in body and mind,

moved me with profoundest pity. Sabbatarians plead that there are six days in the week when people can get outings and car-rides, but what can laboring men and women, seamstresses, shop-girls and others who have to toil from early morn till dewy eve and even a late bed time, do in the way of such privileges from Monday morning to Saturday night? Many of these extreme Sabbatarians who are so very holy on Sunday are extortionate sweaters all the week, grinding the faces of the poor, and cutting down wages until it is barely possible for many of these people to live in the most abject poverty. A partial Sunday street car service, commencing with church hours, continuing through the afternoon and closing at say 9 p. m., would be an unutterable boon and blessing to thousands, enabling them to go to church, take an outing to the suburbs, and get rest and refreshment for their physical, mental and moral being, with but little infliction of extra work on street car employes, whose number might be somewhat increased so as to have a reserve Sunday force."

This is the situation everywhere. Sunday traffic for the most part consists in hauling people to the parks and breathing places that have been provided for them.

BIG LOAD AT TERRE HAUTE.

Our illustration kindly furnished by Russell B. Harrison, president of the road, tells its own story of the big load carried on the last car from Athletic Park on the occasion of a recent ball game. The double decker was



built from designs by Mr. Harrison, is mounted on a Peckham truck and driven by two 30-horse-power Walker motors. By no means the least interesting feature of the load was the Sterling fare register which showed 175 fares—the number of passengers carried at one time on this trip.

Eighty-one street railways are operated by electricity in Europe according to Philip Dawson. The aggregate mileage is 440. In six cases the generators are driven direct. The steepest grade is that of the Mt. Saleve Rack Railway, 1 in 4; several others having a 1 to 15 grade.



Interesting Bits of Information from all Parts of the Country,
Boiled Down for Busy Readers.

Steam railroad men of New Jersey have organized the Steam Railroad Men's Protective Union to oppose the electric lines that carry freight.

In St. Louis an electric car was chartered to convey a wedding party, including the bride and groom and best people, to and from the church.

The Tacoma Traction Company compels conductors of trolley cars to register at Hosmer junction as a precaution against crossing accidents.

"The trouble with these teamsters," said a gripman, "is that they seem to think that the car is able to do half the dodging to get out of their way."

An effort is making to introduce mail cars in San Francisco. Few cities offer better opportunities for a successful working on account of the steep hills and difficulty of teaming.

The Toronto Street Railway net earnings for September were \$108,299.38, an increase of \$4,168.98. Operating expenses were cut down \$1,120.49, making a total increase of \$5,289.47.

Leaves on the track caused a collision at West Hartford, Conn. The motorman of the offending car reported the track so slippery with leaves that the brake would not hold the wheels.

Doors of the cars of Citizens Railway, Detroit, have neat curtains to prevent the light from the interior of the car being reflected in a manner to interfere with the motorman's vision of the track.

The use of the tracks of an electric railway by a steam road occurred at Elwood Junction, Pa., in September, when a passenger train of the Pittsburg & Lake Erie Railroad was transferred around a wreck.

The supreme court has affirmed the validity of the \$17,500,000 bonds issued October, 1893, by the Market Street Railway Company, San Francisco, at the time of the consolidation of the eleven roads of the city.

That corn would be used as fuel for locomotives on the Alley Elevated Railroad, Chicago, was the startling announcement of an interior paper. When seen by the REVIEW man Secretary Glade would not acknowledge the corn.

New York companies have discovered a scheme on the part of conductors to work them by means of transfers. Newsboys have made a practice of begging transfers from passengers alighting at transfer points, which they sold to conductors at 2 cents each.

Since its organization in 1883 the Cleveland Electric Railway has paid in taxes and paving street over \$300,000. While the Cleveland City Railway in the past ten years has expended for the same purpose \$764,066; a total for the two roads of over one million dollars.

Leo Reiss, a driver of a brewery wagon, was fined \$5 and costs for obstructing the United States mail. He got on the track in front of a mail car on the Third avenue line, New York, and walked his team slowly in spite of the remonstrance of the conductor and gripman.

"Well, I'll be switched," murmured a stranger as a motor car hauling a sprinkler passed him, "Ef they ain't a haulin' water, an' they hain't got sense enough ter keep it from leakin'. A little more'n half a mile an' thar won't be a bucketful of water in that there hog'shead."

The Brooklyn Heights Company will distribute \$10,000 prize money pro rata among conductors and motormen, who until May 1, 1896, shall have had no accident causing injury or damage to persons or property or to the company's property, or have not been suspended for violation of rules.

At Pittsburg a West End Traction car ran away and plunged end over end into a rocky ravine. Several persons were killed. The motorman reversed the current, and could have stopped the car, had not a boy pulled the trolley from the wire twice in spite of the resistance of the conductor.

The Union Traction Company, Philadelphia, has changed the system of stopping cars to the far crossings. Where two lines cross, the car makes a stop at the near and far crossings, but passengers are permitted to alight only at the second crossing. North and south cars have absolute right of way.

Side entrance cars with vestibule smoking compartments can be built without infringing any patent rights. A St. Louis judge has decided that there is no patentable novelty in the invention of Edward Chesterman and that the idea might occur to any one, while an ordinary mechanic could work it out.

Records were smashed in a Kansas manufacturing town recently when car 64 of the electric road carried six passengers for one fare. A woman got aboard with five children all her own, one a baby in arms, and the oldest four years. The family occupied 2½ seats. "Children under 5 years are taken free when accompanied by parent or guardian."

The South Orange & Maplewood Street Railway Company has completed a portion of its line. Frank Brewer is president and Henry A. Page furnished the capital. The line when completed will be parallel with the Delaware, Lackawanna & Western road for 5 miles. The right of way is through private property, and is fenced in, there being certain points for cars to stop.

EDISON'S PATENTS.

Thomas A. Edison never fails to take advantage of an opportunity to get in a roast on our United States patent system. It appears from a recent interview in the *Monthly Illustrator* that the simple business of inventing taken as a whole has not been a profitable one to Mr. Edison although on some particular inventions he has cleared small fortunes. The money he has made has been derived from manufacturing in connection with invention. He suggests as a change which would be beneficial to all concerned, that the man who first secures a patent or makes an application be given the benefit of the doubt until the question of priority has been settled. This he thinks would hasten the trial of cases and prevent piracy. Perhaps this would be an improvement over the present way of doing things but it should be remembered that it is not always the patentee who is the honest inventor, and furthermore it is very likely that the proposed arrangement would only transfer the dilatory tactics from one side of the case to the other. The fault lies not so much with our patent system as with tardy methods of administering justice. Another matter which greatly complicates the question, and which is inherent in all inventive progress, is the fact that there are generally several inventors unknown to each other doing the same thing about the same time. Until someone proposes a way of getting around this difficulty there will always be more or less trials and tribulations connected with patents.

GONG RINGING LAW OBEYED.

Trustees of the village of Carthage, O., wished many a time in one short week that they hadn't passed an ordinance requiring the continuous ringing of the electric car gongs, while the cars were within the village limits. They didn't know the ordinance was loaded, but soon found out when large delegations of citizens cornered them everywhere they went and protested against the horrible din the cars were making. General Manager Bradford, of the Mt. Auburn electric line, was smiling to himself at the joke on the trustees, who had provided for a penalty of \$50 for each offense, if the provisions of the ordinance were disregarded. Mr. Bradford notified the motormen to obey the ordinance, warning them that the company would not stand responsible for their failure. The result was that Carthage was on the verge of nervous prostration, and the disease extended two or three blocks back on both sides of the street railway tracks. There was more noise in the village than was ever dreamed, for there was scarcely a minute in the day that the gongs and bells were not clanging. It was really a case of "much ado about nothing" for Carthage has never had a personal injury case, or a collision. An over zealous member of the board thought to advance himself in popularity, but got himself disliked. He introduced the ordinance "because he was afraid there would be an accident." Several runaways resulted from the enforcement of the ordinance, and one motorman said he couldn't sleep because he imagined himself ringing his gong.

BRISTOL TRAMWAYS OPENING.

In our November issue we published a detailed account of the new electric line of the Bristol, England, Tramways. Some idea of the interest taken by the Bristol populace can be obtained from a glance at the accompany-



A ROUSING WELCOME.

ing photograph which was taken on the day of the formal opening. For the present, at least, the Bristol company does not seem to need any artificial attraction to induce travel. The simple novelty of the electric road attracts a bigger crowd than any pleasure resort an American manager could devise. We are indebted for the illustration to the *Railway World* of London.

CUT TIME AND FARE.

Adoption of electric traction by the Chicago City Railway Company has caused several steam roads to lower their fares and shorten their running time to suburban points. The points affected are about 50 minutes by street car from the center of the city, while the running time of the steam roads was 30 minutes and double the rate of fare charged by the street railways. Additional trains have been put on between these points by the steam roads, which do not stop at all stations, so that quicker time can be made. These efforts on the part of the steam roads are not likely to cut into the traffic of the street railways to any great extent until they operate cars at as frequent intervals as the street railways, which cannot be done unless they adopt electric traction. When that time comes the company which furnishes the best and cheapest transportation, will get the bulk of the business, leaving the overflow to its less enterprising competitor.

John Shaw, Jr., with Alfred Dickinson as electrical engineer, has worked out a plan for an electric road between Derby and Ashburne, England. It would connect with the Derby tramway and be an interurban of considerable importance, passing through several small towns. Land owners are behind the plan.

TEN YEARS AGO.

It was a select party in one of the smoking compartments of the Chicago special to Montreal. A. H. Hoffman, of the Falk Manufacturing Company, Milwaukee, had not begun to show his dexterity with cards, so the gentlemen were talking over the early days in electric railway construction. A man who has been in all branches of the business from lineman, power house, car house to manager, laughingly remarked: "Ten years ago it was impossible to have everything in good running order on the trial trip. Then the power plant and cars were kept running in private for weeks before a public trial was attempted. Even on the appointed day something was likely to happen on the line, or in the power house to fill the constructing engineer with dismay. The trick in those days was to get the line accepted. After that she could refuse to run if she wanted to. The constructing engineer had been discharged by the acceptance of the work, so the company had to attend to its own funeral. To-day it is unnecessary to go through such experimenting with each branch of the service, for so great has been the advance that it is only necessary to start to discover everything in good running order.

* * *

"Those were the days of experts. It was soon discovered that the experts did not know as much as the local company's employes to whom they usually turned for the solution of the difficulties that presented themselves. Every old road has had a similar experience to this one. Things were not running as they should, and it seemed as if the whole plant would go to smash, if something were not done. The manufacturer of the apparatus was accordingly requested to send someone to remedy the defect, for of course the concern that built the plant knew more than the purchaser. But in practice the facts demonstrated that in most cases the purchaser's employes had more practical knowledge of the apparatus than the so-called expert, who was long on theory, having just graduated from a technical college, but short on practice, having had no experience in the shops, nor in street railway plants. These experts spent a large part of the time in looking wise. Occasionally, for the sake of variety, they would visit the car house. On one particular occasion at dusk a car came in because the lamps would not burn. The road was short of cars, and all the men were busy, so the expert just to be accommodating, said he would fix her. He worked an hour without being able to get light. The foreman happened along, inquired the trouble, got on the car, screwed up the lamps, and there was light.

* * *

"In those days it was impossible to tell off-hand what was the matter with defective apparatus. It required a lot of work to discover the source of the trouble. The expert would sit with his elbows on his knees, both hands holding his face, and intently gaze upon the apparatus. 'Start her up again,' he would say, after he had tinkered awhile, only to shout, 'Stop her,' as he dis-

covered his work had been fruitful in adding complications, but fruitless in remedying defects. 'Start her up again,' and 'Stop her' were the principal facts that he knew. Yet it was necessary to go through all of this experimenting to bring the street railway business to the present state of perfection. As progress is made, the triumphs of to-day will seem as puny as those of ten years ago."

A NEW INSULATOR.

A new insulator has been lately put on the market which has for its object the doing away with tie wires, whatever may be the size of wire supported.



FIG. 1.

Figure 1 shows the insulators and Figure 2 the method of fastening. A plug with a mushroom shaped top crowds the wire against one wall of the notch made for it. The wire cannot move up because of the shape of the cavity and can not pull either way because a pull causes the plug to roll and clamp the wire.

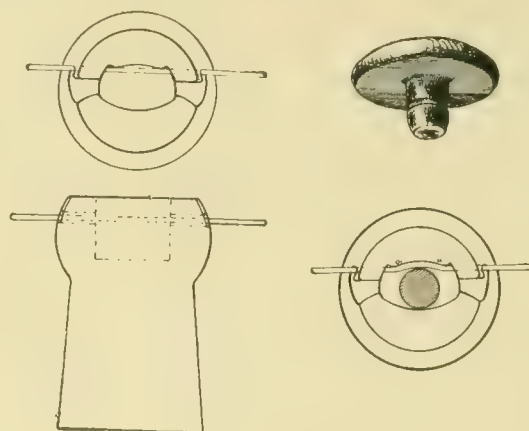


FIG. 2.

For railway feeders the insulator is made heavy and of black glass, taking in wires up to No. 000. It has the advantage of being a cheaper construction than any forms of clamp insulator now in use and costing with plug no more than an ordinary insulator with tie wire.

The works of the G. C. Kuhlman Company, Cleveland, are reported to have been totally destroyed by fire.

THE GALT, PRESTON & HESPELER STREET RAILWAY AND ITS FREIGHT SERVICE.

BY W. H. LUTZ, SECRETARY AND TREASURER.

The above electric road as its name implies connects the three towns of Galt, Preston and Hespeler, and as the road does a combination service of passenger, freight and parcel express, and as it is, I believe, the pioneer in this class of work, a description of the service may be of some interest to your readers.

The three towns named are noted throughout Canada for their large manufacturing industries, Galt having long been known as the Manchester of Canada, while the large industries of Preston and Hespeler are exceedingly

with the Canadian Pacific Railway to carry freight and passengers for them, and in the spring of 1894 contracts were let to build this portion of the road. The track was laid with 56 pound T rails; ties of cedar and tamarack spaced 2 feet between centers, and everything done in a most substantial manner. At the Canadian Pacific Railway station in Galt our tracks were connected by switches with the tracks of that railway, and in addition to this sidings were put into every factory yard in Preston, thus enabling the manufacturers to load and unload their freight at their own doors. The switches used are ordinary railway switches with signals, etc. The road was then equipped with ordinary trolley cars as well as cars with a compartment for baggage and express goods. The company also purchased a light Baldwin locomotive, for heavy freight service. For freight work the com-



COMBINATION MOTOR AND BAGGAGE CAR WITH ITS TRAILERS

close to them in the race for popularity. These towns are all situated in the county of Waterloo. Galt is supplied with good steam railway facilities, being on the main line of the Canadian Pacific Railway and also having two branches of the Grand Trunk Railway. The town of Preston is about three miles from Galt and Hespeler is about 3 miles from Preston, and while the Grand Trunk Railway runs through both these towns they have no connection with the Canadian Pacific Railway. There has always been a large amount of business intercourse between the three towns and in consequence of this and the fact that the facilities for traveling between the towns were very poor, the idea of connecting them by means of a trolley line was introduced a couple of years ago. A company was accordingly formed and the affair took definite shape. It was decided to first build the road between Galt and Preston. Franchises were procured from the various municipalities, arrangements were made

pany purchased a small ordinary freight car of about 20 feet inside length to be used as a trailer for carrying broken carloads, while for carload lots we use entirely the ordinary Canadian Pacific Railway freight cars. When carloads for Preston or Hespeler arrive at the station here they are shunted on to our tracks, and any carloads we bring down we shunt over onto the Canadian Pacific Railway tracks. This freight work was done at night after the passenger traffic had ceased, the Baldwin locomotive being used as the motive power. This portion of the road was opened for traffic in July, 1894, and proved so successful that early in the spring of 1895 it was decided to push on the work and extend the road to Hespeler. In building this part of the road the company decided to buy its right of way instead of occupying the highway. It accordingly owns this part of the right of way and has the track between Preston & Hespeler fenced in. The roadbed is of the same general

construction as the part between Galt and Preston except that the bed is built above the level of the ground and is ballasted to the tops of the ties only, in order to save trouble from snow in winter.

In building this portion of the road the company bought a fine park about midway between Preston and Hespeler. This park is so situated, owing to the track not being on a highway that it can only be reached by the cars, there being no highway within nearly a mile of it. It is lighted with electric lights, has a fine river running through the centre of it; has plenty of shade, has grounds for games, dancing pavilions, refreshment booth, hot and cold water for picnic parties, etc., etc. Immense numbers from all three towns avail themselves of the opportunity of spending days and evenings at this park which the company named "Idylwild."

This portion of the road was opened for traffic about August 1, 1895, and so increased the freight business that the company decided to buy an electric freight motor car. This car is fitted up with two G E 1,200 motors with type K2 controllers and is 32 feet inside length. It is strongly built and weighs with its iron floor about 13 tons. This car has proven extremely satisfactory, as it is not only capable of carrying from 14 to 15 tons within itself, but will haul without trouble two loaded Canadian Pacific freight cars at a time from Galt to Hespeler. Since procuring this freight car we have practically discarded the light locomotive, and now do all our freight traffic in the daytime. In addition to carrying freight in connection with the Canadian Pacific Railway we also carry its passengers to and from Preston and Hespeler, that railway issuing coupon tickets from all its stations to these two towns, our conductors detaching the coupons and returning them to the office as cash. We have thus placed these two towns practically on the Canadian Pacific Railway. Our cars make trips every 30 minutes and connect with all trains on that railway.

The system we have in use in connection with handling fares of different amounts is as follows, and is probably open to improvement: First we have four classes of passengers. Local are between Galt and Preston, between Galt and Hespeler, and between Preston and Hespeler. For local passengers we only issue tickets in sheets of six at 25 cents per sheet—otherwise they pay 5 cents cash fare into conductor's cash box. One way passengers between the different towns pay entirely by cash fares, to Preston from Galt 10 cents, to Hespeler 15 cents, and between Preston and Hespeler 5 cents. For all passengers who intend returning we issue return tickets, and deal with them as follows: A passenger gets in the car at Galt and wants to go to Preston and return. The conductor takes a return ticket from his pocket, punches it, and gives it to the passenger; the fact of the ticket being punched indicates that it has been used one way. On the return trip the ticket is taken up. A passenger to Hespeler and return is treated in a similar manner, but when the car leaves Preston on its way to Hespeler the conductor again passes through the car and every passenger must produce his ticket or pay cash

fare. Those passengers who are from Galt and also those from Preston who hold return tickets have their tickets punched. This makes 2 punches in the Galt to Hespeler ticket, and indicates that it has been traveled on one way. On the return trip this ticket is again punched between Hespeler and Preston and between



STYLES OF TICKETS.

Preston and Galt the ticket is taken up. Our prices for these return tickets are: Galt and Preston, 15 cents; Galt and Hespeler, 25 cents; Preston and Hespeler, 10 cents. In summer we issue return tickets to the Park at 20 cents each, or a sheet of 8 tickets for \$1.20. This is the system we have in force. Accompanying are samples of our various tickets.

The power house is situated in Preston and is a stone building about 70 by 130 feet. It is equipped with two tandem compound condensing engines of 125 horsepower, and two generators, one Westinghouse and one General Electric. Adjoining the power house is a car barn 70 by 125 feet, with iron sides roofed with gravel. We use Taylor trucks throughout with wheels 33 inches in diameter, 3½-inch tread, and 1½ flange. The axle on the freight motor is 4-inch.

We have also 5 private telephones distributed along the line, the entire length of which is about 9 miles. These telephones are contained in boxes with door and keys, so that the power house and office can be communicated with from almost anywhere along the line.

We carry an average of about 20,000 passengers per month, the fares from whom run from 5 cents to 25 cents, while the freight business averages 600 tons per month. In addition to this we do a large parcel business. The freight carried in carloads consists of iron, lumber, wheat, wool, oil, bricks, etc., inward. The manufactured goods are carried outward. We have found the freight department highly satisfactory ever since the road first opened.

A resident of Calcutta who had trouble with a street car conductor writes in the Indian Mirror: "The passengers are sometimes very roughly handled by the tramway executive." Executive is good, and much more imposing a title than that of an ordinary everyday conductor.

\$200,000 FOR MAIL SERVICE.

C. Neilson, second assistant postmaster-general, in his annual report recommends an appropriation of \$200,000 for a mail service on street railways. The service has proved so satisfactory the short time it has been in force, that it is recognized as a necessity. In New York city the street railway mail service has effected a daily saving of 951 pouches of mail that were formerly sent over the elevated. In addition to the saving of a large amount of time in local delivery it also facilitates the delivery of missent mail. The principal object of the service is to relieve the main post offices, especially those in the large cities, of as much work as possible. It will also insure almost absolute safety from detention, by being mislaid and otherwise over-looked, of the mail intended for other substations, and materially assist the prompt delivery of mail.

Arrangements have so far been made in a peculiar way with all the street railway companies. The purely pouch mail has been paid for, as a rule, by weight, just as the steam roads have been paid, the mail being carried on the front platform in charge of motorman or gripman, at certain intervals during the day. The arrangements for special postal half-cars and full cars differ materially and have been on a basis of just what the post-office department could spare from the mail-messenger fund for trying such experiments. In no case has the government paid any more than the wages of the motorman and conductor; in most cases less. "The street railroad companies," says Mr. Neilson in his report, "have been very liberal with us in these arrangements and have assisted us in a most commendable manner. They have understood the position and the necessity for the experimental stage of the service before any stated reasonable remuneration can be asked for. The \$200,000 asked for in our estimates for next year is the amount that it is thought will cover the necessities of this branch of service at fair rates for the coming year, based on such information as we could get from the best authorities as to the cost of the service to the railroad companies."

The experiments were tried in St. Louis, Brooklyn, Boston, Philadelphia, Chicago and New York, where the fact has been established that it is consistent, economical and almost necessary to establish exactly the same three branches of the service under the improved methods of street car service, that are already successfully established on the steam roads.

"This street railway service," says Mr. Neilson, "contemplates at least eight services and possibly twelve per day, and even greater in some instances, the value of the service being as much in its possible frequency as in any other point. It is hoped that in a very short time this branch of the service will increase to such an extent that the regulation wagon service will be almost eliminated so far as the mail station and suburban post office are concerned, with a possible future of supplying letter carriers direct from the cars, or an increase in sub-offices to

such an extent as to greatly improve the service. The total expense, as near as it can now be estimated, will be very much less than the present estimate for wagon service for the same amount of service rendered; that is, the same number of deliveries. However, by the electric lines the service will be more than doubled as compared with that rendered by the wagons, with a very slight increase over the present cost of the wagon service, if any. The impression is that the entire improvement will be gained for practically the same amount of expense to the Government, which will undoubtedly be a most satisfactory result.

"It is recommended that legislation be enacted to the following effect in connection with the next Post Office appropriation bill:

"For transportation of mail by electric and cable cars on routes not exceeding 20 miles in length, \$200,000; Provided, That—

"First. The postmaster-general is authorized and directed to adjust the compensation to be paid for the transportation of mails on electric car and cable car routes upon the conditions and at the rates hereinafter mentioned.

"Second. For full railway post-office cars, to be used for postal purposes only, to be operated independently of other cars, and to be not less than 16 feet in length, inside measurement, not to exceed 12 cents per mile traveled.

"Third. For compartment post-office cars, to be operated independently of other cars, the compartment used for postal purposes to be not less than 10 feet in length, inside measurement, and full width of car, or not less than 13 feet in length and 5 feet in width, inside measurement, not to exceed 7 cents per mile traveled.

"Fourth. For trailer post-office cars, to be run with regular passenger cars, and to provide space for postal purposes not less than 16 feet in length, inside measurement, and full width of car, not to exceed 5 cents per mile traveled; or if under 16 feet but not less than 12 feet in length, inside measurement, and full width of car, not to exceed 4 cents per mile traveled.

"Fifth. All of the post-office cars mentioned in the preceding sections shall be of such style and character, furnished in such manner, run with such frequency and speed, and on such schedules, as shall be required by the postmaster-general; and shall be constructed, fitted up with the necessary furniture and fixtures for the proper handling and distribution of mail, maintained, heated and lighted by gas or electricity, by and at the expense of the railroad companies; and clerks in charge of the mail shall be carried without additional charge therefor.

"Sixth. When post-office car service shall be authorized on any route by the postmaster-general, as provided herein, no additional compensation shall be allowed on account of the weight of mail carried on said route; and it shall be the duty of the railroad company operating said route to carry additional mail in closed pouches in charge of its employes on other than the post-office cars when



STREET RAILWAY MAIL, THIRD AVENUE, NEW YORK.

so directed by the proper officer of the post-office department, without further compensation.

"Seventh. For routes upon which no post-office cars are authorized by the postmaster-general, but on which mails are carried in closed pouches in charge of employes of the railroad company, the pay per mile of route per annum on routes carrying their whole length an average weight of mails per day of 800 pounds or less shall be not to exceed \$75; over 800 pounds, the rates to be as provided by existing law for transportation of mails on railroad routes; the average weight to be ascertained as provided by law; the service to be performed with such frequency and speed and by such a schedule as will be satisfactory to the postmaster-general. The difference between the regular steam railroad rate of \$42.75 per mile of route per annum for weight not exceeding 200 pounds per day and \$75 per mile per annum for weight not over 800 pounds per day is recommended because of the frequency of the service and generally short routes, which, at the former rate, would give the street railways such a small amount of revenue that it would not justify their handling the mail. It is undoubtedly true that the rate of \$42.75 per mile per annum for steam lines was adjusted and fixed when it was supposed that there would be double service only or one service per day over each line.

"Eighth. The compensation herein provided shall apply only to electric and cable car routes not exceeding 20 miles in length; the compensation for carrying the mails on electric and cable car routes longer than 20 miles to be as provided by existing law for the transportation of mails on (steam) railroad routes."

POSTAL CARS FOR NEW YORK.

The Third Avenue Railroad of New York has recently purchased eight cars for the United States mail



INTERIOR STANDARD STREET RAILWAY MAIL CAR.



STANDARD STREET RAILWAY MAIL CAR

service. They were built by Brill and are mounted on Peckham trucks. The car body measures 20 feet over the end panels, and is fitted on the inside with standard

United States mail service pigeon holes, stamp tables and assorting tables. It is finished entirely in hard wood and has monitor deck roof, decorated veneer ceilings and a large sliding door at each end with 4-foot opening. It is lighted with the Consolidated Car Heating Company's Pope gas apparatus and Gold heaters. Unlike the Chicago postal cars they are devoted entirely to the mail service instead of being combination cars.

A MUNICIPAL BOOMERANG.

A short time ago one of the cities in England availed itself of Parliamentary authority, and became the owner of a part of the tramway system in the town. The franchise for the remainder of the lines had not expired. After becoming possessor, the next thing was what to do with it, for the portion so secured was practically of little use or profit by itself. So the city advertised the lines for rent for a term of years, at not less than £1,000 per annum. The only bidder was the old company, and the deal was closed. When the city bought the road it was voted in council that employes should not work more than 10 hours in any 24. The company declared it could not discriminate against the men working on its own tracks in favor of those on the city lines, as the same cars ran over both, and not being able to pay 12-hours' time for 10-hours' work at once cut everybody down to 10-hours' work and 10-hours' pay. Then there was a howl. The old men wanted to work 12 hours; so did the others. When they visited the company the manager showed them how helpless he was, as the revenue of the road would not permit more pay. Then the crowd went for the city council and made things hot. Council asked company to fix matters. Company said the only way was to raise the fares. The fares were accordingly raised, which procedure raised the public in a storm. Council became desperate, and appealed to the company to help them out. Company said if they put the fares back and paid 12-hours' wages for 10-hours' work it would entail a loss of \$10,000, and as the rent was about \$5,000 per annum, the city would have to allow rent free and pay the other \$5,000 to the company. Finally the city council repealed the 10-hour law, and peace and fares were restored.

KUHLMAN COMPANY BUILDING CARS.

The G. C. Kuhlman Company, Cleveland, was not so seriously injured by its fire, as was reported. Only the furniture factory and wood working department were injured. The car erecting and paint shops were not burned. No delay will occur in turning out ordered work in any of the branches, as the wood work is being done at other shops. The loss was fully covered by insurance. The Kuhlman Company is rebuilding the burned buildings, and will increase the capacity of its plant, which is made necessary by the rapidly growing business of the company.

CONDUCTORS HELD UP.

Many cases are reported from various parts of the country, where men in charge of street cars have been held up by footpads. In Louisville these cases are frequent, especially at the end of the lines. Motormen, there are no conductors, have to reverse the trolley, which leaves the car in darkness, when it is off the wire. Then the robber removes the change box from the dash and is out of the way before the theft is discovered.

Only last month two highwaymen boarded an empty car drawn by mules, forced the driver to leave his post, drove the car, rifled the change box and fare box, and abandoned the car when they had accomplished their purpose. In Minneapolis conductors are permitted to arm themselves as a precautionary measure.

General Manager McLean, of the Citizens Street Railroad, Indianapolis, received information, which caused him to notify his conductors to be on the watch for three men, who were about to make a raid on their pockets. Two of them would enter a car, while the third would remain on the platform with the conductor. He would detach the trolley, and when the conductor was trying to replace it, the three men would rob him. Two masked men held up a car at Argentine, a suburb of Kansas City, securing \$4 from the conductor, who had fortunately cashed in before he left the barn on that trip. One passenger was in the car but was not molested. In localities where cars run through sparsely settled districts, conductors should be permitted to carry revolvers.

SHORT CIRCUIT AT BOSTON.

The West End Street Railway suffered a delay of 35 or 40 minutes on a small part of its system recently by a short circuit in one of the poles where the underground feeds into the overhead system. An employe was drilling a hole in the pole and carelessly let his drill go through until it made contact with one of the feeders in the pole. The results hardly need describing. The display of fireworks attracted a large crowd and the arc once started by the offending drill with several hundred horse-power behind it left the pole in a demoralized condition before the current was cut off. This is the first burn out of any nature the West End has had in connection with its underground system.

QUICK REPAIR WORK.

The main shaft driving the Fifth street cable in Kansas City broke recently in two places. Being 12 feet long and 16 inches thick no engine works within hundreds of miles could handle the job. Finally the shaft was shipped by special train to the Edward P. Allis Company at Milwaukee, where the pinions and crank were pressed off and shrunk on a new shaft, made by turning down a 20-inch which was in stock. The actual repairing took only three days.

NO ELECTRIC TRACTION FOR ILLINOIS CENTRAL AT PRESENT.

Whatever action may have been taken by the Illinois Central in the direction of electric traction for its suburban trains in Chicago seems to have been called to a halt for the present at least. J. T. Harahan, second vice-president, stated very positively to a REVIEW representative recently that "the matter is not being considered at present." The company is equipping its suburban cars with Pintsch gas for lighting and arranging for steam heat from the locomotives, so that a change is evidently not contemplated soon. However, we venture the opinion, that the Illinois Central officers have not taken any vows to leave the electric equipment matter alone and there are no grounds for certainty that it will not be taken up again before a great while. The statement which went the rounds of the press that the stockholders would vote on the question at their meeting November 20, was without foundation as the matter did not come up at all, the meeting being for another purpose.

The position of the officers with regard to this matter was explained fully to us by the chief engineer, J. F. Wallace. Electric traction for the suburban service was thoroughly investigated in an official way before the World's Fair. Since then no official action has been taken. This does not mean that the heads of departments are going to sleep or keeping their eyes shut to electrical progress. They are progressive men and some are watching and studying electric traction as individuals with great interest. They fully realize that the day is probably near at hand when it will pay the road to adopt electric suburban service. This, however, may mean that it will be several years before the matter is officially considered and taken up with the electrical manufacturing companies. This fact that some of the officers are watching developments as any wide awake men should, has been several times construed by sensational reporters as meaning that there will be an immediate change. Consequently those electrical supply men who are unwise enough to follow the pointers given by the daily paper reports have been fairly tumbling over themselves to get down to the Illinois Central offices to get a chance to put in bids. We think that the company will not be inclined to put any money into electric equipment for the next two years because it has a \$2,000,000 job of Chicago lake front park filling to take its money and attention for that period.

PHILADELPHIA CHARGES 8 CENTS.

While in other cities there is agitation for three-cent fares, old slow-going Philadelphia has set an example for all street railways by adopting an eight-cent fare. Single fare remains a nickel, but passengers who desire transfers are required to pay three cents additional. Transfers have a 60-minute time limit. Considerable opposition to the new order has been created. Public

meetings are being held, ministers are denouncing the company in their pulpits, and the city council has taken a hand in the fight, but the new system remains intact.

ELECTRICITY IN UNDERGROUND CONSTRUCTION.

The work on the new underground electric road in London, known as the Waterloo & City Railway, is being rapidly pushed and electricity is probably playing a more important part in the construction than in any previous underground road. R. W. Weeks describes the machinery in the London Electrical Engineer. Electricity is used for lighting and running electric locomotives. The lighting mains are supplied at 100 volts, and the electric locomotives at 200 volts. For running locomotives two 100-volt generators are run in series so that only one kind of generators is used. The generating plant is temporary and to a certain degree portable. It consists of locomotive boilers and small direct connected engines. The locomotives are of peculiar design on account of the very narrow gage and the power required of them. They were built to specifications requiring them to be able to draw 5 tons on a level at a speed of seven miles an hour. The gage is 18 inches and the width over all 3 feet. There was not room for the motor between the wheels and it had to be placed above the truck. It is geared to one axle by double reduction bevel gear and connecting rods transmit to the other axle. Strange as it may seem copper gauze brushes are employed. They are set square end on to the commutator and are held in guides which clear the commutator by only $\frac{1}{8}$ -inch to prevent burring over when the motor changes direction. It is stated that these brushes give satisfaction.

LOVE'S LABOR LOST.

The Norwalk Tramway Company and the Norwalk Street Railway Company have been having a little friction. Recently the railroad depot was moved from the city's center to a point off the Street Railway's lines. Naturally the company wanted to accommodate the citizens and strangers, so a franchise was secured. Two hundred men were set to work one Saturday morning tearing up the street. Col. Frost, attorney of the Tramway Company, saw the workmen from his office window in the Mahackemo block, when a brilliant idea struck him. He hurried off to the court house, and as owner of the block, secured an injunction restraining the company from laying tracks, or operating its line over them. Then he went out of town, so that he could not be reached in process for dissolving the injunction. E. J. Hill, president of the Norwalk Street Railway Company, was not asleep. He dispatched an attorney to Bridgeport, who got the injunction modified, so that the company could lay the tracks, but could not operate over them. When Col. Frost returned Monday he saw the tracks in place, looking as if they had been there for months, with a car standing in the center of the block.

HOSPITAL FOR EMPLOYEES.

On November 5, the Steam and Street Railway Employees' Hospital Association opened its new hospital at 17 South Sheldon street, Chicago. The association was organized in August, 1895, its object being to provide a hospital where injured and sick members can have medical treatment at the hospital for a nominal sum, with medical attendance for their families at home for a small additional fee. The membership is divided into three classes:

Class A—The holders of certificates in this class, in case of accident or sickness, are entitled to remain in the hospital of the association and receive medical and surgical treatment, nursing, medicine and board. It also entitles the holder to free consultation on all diseases at the office of the association for the sum of \$7 per year.

Class B—The holders of certificates in this class can, in addition to the benefits of Class A, remain at home in case of accident or sickness, and receive medical and surgical treatment and medicine for \$10 per year.



RECEPTION ROOM.

Class C—The holders of certificates in this class can, in addition to the benefits of Class B, transfer this certificate to any member of their own immediate family who may require medical or surgical treatment in the hospital of the association. Certificates \$15 per year.

Cases of confinement \$5 extra must be attended at home.

Holders of Class A certificates may make payments in two installments, Class B, three installments, Class C, four installments, each installment having 30 day's grace. As there are about 38,000 steam railway employees and about 10,000 street railway employees in Chicago, the association has the possibility of having one of the largest hospitals in the city. Even if only 10 per cent of the employees become connected with the association in Class A, an annual revenue of \$33,600 will be secured. The benefits are so readily comprehended, that a large proportion of the conductors, motormen, gripmen and horse car drivers of street railways, engineers, firemen, conductors, brakemen and switchmen of steam roads, who are eligible, will join forces with the association.

It is provided that all money received in excess of the expenses of maintaining the hospital shall go into a sinking fund, which is to be the nucleus of a building fund to be cared for by trustees appointed for the purpose.



THE HOSPITAL.

Should there be room in the hospital, medical attendance, rooms and nurses will be let to patients who are not eligible as members of the association. Another department will be a training school for nurses.

A three-story and basement building with 36 rooms has been leased, which has been furnished to accommodate about 70 patients. The lower floor is the office, pharmacy, dining room, kitchen and sleeping rooms for nurses and surgeons. The first floor has the reception room, wards and private rooms for the most serious cases, and operating rooms. The second and third floors are for convalescents. The building is heated by steam. The lease runs for four years with an option to lease the



OPERATING ROOM

adjoining buildings shown in the illustration, whenever they are needed. An ambulance has been purchased, furnished with the latest appliances for making patients comfortable. Whenever it is called, a surgeon accompanies the ambulance. Arrangements have also been made with the city authorities for their ambulances to take patients to the hospital in cases of emergency.

Heretofore men injured on the street railways or steam roads have been sent to the county hospital, or other institutions in the city, where they have been denied many comforts because they could not pay for them. The new hospital will be the same as their own home, for it is owned by them. The chief advantage is the low cost of medical attendance, \$15 being sufficient to furnish medical attendance and medicines for a family for one year. The payment of \$7 entitles a member to board and attendance in the hospital for year, should he require it that long. The management is composed of street railway and steam men, and an efficient corps of physicians have been engaged. The officers are William M. Collins, president; H. Oxtan, Fred Meyers, J. D. McClain and J. W. Harrison, vice presidents; H. W. Looby, secretary; A. M. Unger, M. D., treasurer and superintendent; J. A. McDonald, M. D., house surgeon. At the head of the surgical staff is Dr. D. A. K. Steele, of Chicago, the most noted surgeon in the west, and who is also president of the College of Physicians and Surgeons. The plan can be adopted in other cities.

THOSE NEW YORK FRANCHISES.

Daily newspapers all over the country have made a great ado about the big bid for franchises recently made in New York, but it will be possible for the city not to receive one cent for the franchise in spite of the fact that 38½ per cent of the gross receipts were bid. There is in progress a legislative investigation of all the street railways in the State of New York. Several weeks ago a franchise from Harlem to Bronx river was offered at auction, the highest bid being 6975⅙ per cent of gross receipts. The attorneys who did the bidding were called before the legislative committee to testify how it was possible for a road to exist with such a handicap. One attorney said any bid over 100 per cent would be illegal, but if the bid had been accepted the people could have ridden free over the line covered by the franchise, as it would not pay to have any gross income for that portion of the road. His company could afford to do this by using the line for a feeder for its lines outside of the city. Another attorney said by leasing the track to an operating company, for a nominal sum, the company owning the franchise would legally comply with all requirements of its contract without much cost.

POWER PLANT NOT A NUISANCE.

St. Louis has had a case in which a property owner endeavored to, secure damages from the Union Depot Railroad Company on the ground that its power plant at Missouri and Geyer avenues is a nuisance. The result was a mistrial. In his charge to the jury Judge Valliant said that the company was engaged in a lawful business and had the legal right to build its power house where it did, at Missouri and Geyer avenues. The mere fact that the location of the power house has rendered the plaintiff's

property less desirable for residence purposes, or has depreciated its value, does not warrant the plaintiff in recovering damages, unless it appears from the evidence that the power house has been so unreasonably or unwarrantably operated as to constitute a nuisance.

MAHONING VALLEY ELECTRIC RAILWAY OPENING.

The towns of Youngstown, Mineral Ridge, Niles and Warren were formally connected by electric road November 4, one year after the organization of the Mahoning Valley Railway Company, which built the road. The trackage of the system comprises eight miles of track, half of which is 68-pound girder, rolled by William Wharton, Jr., & Co., and half 67-pound T from the Cambria Iron Company. The cuts and fills and trestles



TRESTLE. MAHONING VALLEY COMPANY

are sufficient to bring the maximum grade down to 3½ per cent. The rolling stock consists of four Barney & Smith cars, 32 feet long. There are in addition two 30-foot cars and four 16-foot, making ten in all. McGuire trucks are used under some of the cars. The electrical equipment is two G. E. 1,200 motors to each car. Bass wheels are used. The right of way is partly on the highway and partly on private land. The officers are C. F. Clapp, Warren, president; John E. McVey, Youngstown, secretary; A. A. Anderson, Youngstown, treasurer and general manager, to which latter gentleman is due much of the credit of putting this important undertaking through. The formal opening was a cause of great rejoicing in the four cities connected.

DIFFICULT ENGINEERING.

Cutting through a 50-foot hill was one of the feats of the Edmondson Avenue, Catonsville Ellicott City Electric Railway, of Ellicott City, Md. The hill was 300 feet through and was mostly granite, which made the work difficult. Slow progress was made, although two gangs of men were at work, one on each side. In the same locality it was found necessary to divert the course of a stream through a hill in order to get it out of the way of the road.

EXAMINATION QUESTIONS FOR MOTOR- MEN AND CONDUCTORS.

Many roads are beginning to realize the importance of a written examination for applicants for positions of motormen and conductors. The questions given in this connection are those used by the Oakland Consolidated Street Railway, which were kindly furnished by A. K. Grim, secretary and superintendent.

CONDUCTORS' QUESTIONS.

1. In running a main line car how far do you carry a passenger for one fare?
2. When you get to a siding and the car you should pass is not in sight, what would you do?
3. Suppose a line break should occur and you found the wire lying on the ground, what would you do?
4. Suppose you found the line broken but not touching the ground and you had the current, how would you pass the break?
5. Should your car get disabled from any cause, what is the first thing you would do?
6. Suppose you met a disabled car on the track and you could not proceed, what would you do with your car and passengers?
7. How long would you wait on a switch for a car providing the lights were not burning and no car in sight?
8. Suppose you should get taken short at the end of the line and could not leave on time, what would you do with your car?
9. At which end of the car would you start to collect fares?
10. Suppose a passenger gets on your car with several small children and you are uncertain about their ages, what should you do?
11. Suppose a passenger got on your car with a transfer after the time punched in the margin had expired, what would you do?
12. Describe the duties of a conductor in general as you understand them.
13. Suppose your trolley should break, how would you run your car to the house?
14. In going around curves and through switches, what should you be particular to look out for?
15. Suppose your register should get out of order, how would you keep a record of your fares?
16. Where is the conductor's place on the car when not collecting fares or seating passengers?
17. Suppose you wanted to stop at a certain street, about how far from the crossing would you give the motorman the bell to stop?
18. In collecting a fare from a passenger where change has to be made, which is right, to register the fare or return the change first?
19. Suppose that through mistake you had collected a fare for one person twice, what would you do on having your attention called to it?
20. Suppose you had a collision or a person got hurt getting on or off your car or got struck by your car, what would you do?
21. Suppose a passenger should break a pane of glass in your car what would you do about it?
22. What is the first thing a conductor should do after turning his trolley at the end of the line?
23. When running on the main line, at what place in Berkeley would you change your register from "out" to "in"?
24. Suppose in coming from Berkeley, a passenger should get on your car at Lorin, ride to power house and want a transfer via Shattuck avenue or vice versa, what would you do?
25. Suppose on your arrival at a switch where you should pass another car, you found a car broken down, and the car you should pass was on the other side of the wreck, what would you do?
26. If a passenger should give you a Twenty Dollar piece for a fare and you could not change it, what would you do?

MOTORMEN'S QUESTIONS.

1. If you should lose the current while the car is in motion, what would you do first?
2. How would you cut out a motor run by Rheostat or "J" controller?
- How would you cut out a motor run by "K" controller?
3. If you should hear an explosion on your car, what would you look for first?
4. If you should break a controlling cable, how would you fix your car so as to run her?

5. If you should break a reverse cable, how would you fix it?
6. If in running a "J" controller you could not shut the current off, what would you do?
7. Suppose you find your motors "bucking," what would you do first?
8. Suppose your brake should get out of order from any cause, how would you stop your car?
9. How close should you follow a preceding car while in motion?
10. How near should you stop to a preceding car?
11. Suppose you arrive at a switch and the car you should pass is not in sight, what would you do?
12. Suppose there was an obstruction on the track so you could not proceed, what would you do with your car and passengers?
13. Suppose you should meet a disabled car on the track, what would you do?
14. Suppose your own car should become disabled from any cause, what would you do?
15. What is the first thing you would look out for on running up to the point of a switch?
16. Why do you throw your current off and slow down on passing certain points on 13th street between Grove and Jefferson streets, Grove street between 44th and 45th streets, and 47th street between Grove and Shattuck avenue?
17. Suppose on arriving at the end of the road, you reverse your car and when you try to start up from the other end you cannot start for some reason, what is the first thing you would do?
18. Suppose in ascending a grade your wheels slipped, what would you do?
19. How can you tell when your brushes are worn out?
20. What would you do if upon examination you found that your brushes had worn out?
21. Suppose one of the Field or Terminal wires should break or burn, how would you fix it?
22. In starting up your car, what is the first thing you should look out for?
23. If a conductor fails to give you the bell to start out on time, what should you do?
24. Suppose a passenger should get on the front end and the conductor failed to collect the fare, what is your duty in that case?
25. Suppose you had used your last fuse and there should happen to be no lady on board to give you the traditional hairpin, what would you do in that case?
26. If a person should get in front of your car and you could not brake your car in time to save said person, what is the first thing you would do?
27. If your trolley should break from any cause, how would you run your car to the house?
28. If you should be near a line break, and the wire was lying on the ground or on the rails, what would be the first thing you would do?
29. If you are running with the current and the trolley should jump off, what is the first thing you would do?
30. If you are signaled with a red flag, what does it mean?
31. If you are signaled with a white flag, what does it mean?
32. If you see a light swinging across the track at night, what does it mean?
33. If you see a light raised and lowered on the track in front of you, what does it mean?
34. Suppose you should get taken short at the end of the line and could not leave on time, what would you do with your car?
35. Should you have occasion to leave your car for any purpose, what would you do with the controller handle?
36. What is a short circuit?
37. What is a ground?

Besancon, France, is to be connected with Levier by an electric railway 60 kilometers (37 miles) long and of 1 meter (39 inches) gage. In the department Loire an electric road is to be constructed between Viricel-Chazelles and St. Symphorien-sur-Coise. Between the town of St. Romain, department of the Seine, and its railroad station an electric line will be built by a company recently organized.

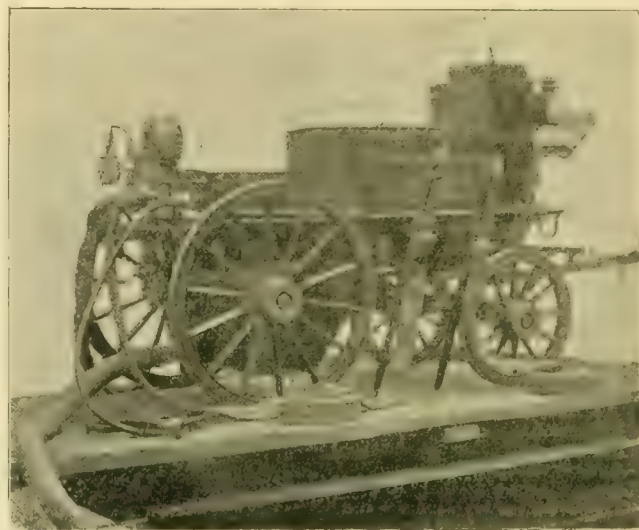
THREE CENT FARES.

Three cent fares are getting to be a fad with some one newspaper in nearly every large city, which hopes to increase its circulation by agitating the low fare for the workingman. Among the most recent outbreaks those of Boston and St. Louis have been the most blatant. In the latter city some one has figured out, that if the fare were 3 cents, and a man saved 2 cents on each car ride to and from his work every working day of the year for 20 years, he would have \$292 at the end of that time. This, it is stated, should be an inducement for companies to reduce their fares. Instead of acting in that direction this supposed fact has a tendency to show the companies how much they are likely to lose. In practice this 3 cent fare movement is not such a benefit as it is in theory. Detroit has had 3 cent workingmen's tickets in use for sometime. Vice-president Hutchins of the Citizens Company recently testified under oath that more workingmen's tickets were collected on the lines that were almost exclusively patronized by the rich, than on the lines which reached the homes of the working class. From this fact it would seem that the workingmen do not patronize the cars even at a 3 cent fare, and that the rich, who can well afford to pay 5 cents, are obtaining most of the benefit which was intended not for them but for the poor.

Right along this line let us cite another instance recently related to us by the president of a street railway in a city of 60,000 in New York state. In order to educate the people in a certain section of the city into which a line had been lately built, it was decided to make a reduction from the 5-cent fare and for a time an 8-for-a-quarter ride ticket was sold. The results were reasonably satisfactory, and when it was concluded that the educating process had been continued long enough to serve its purpose the rate was withdrawn. The line was one connecting a factory district with a residence district although some of the residence territory was very fine and occupied by well to do people. Before shutting off the tickets, which had been sold on the car, it was announced tickets would be sold only at the office. This was done to ascertain what class most largely composed the ticket-buyers. To their great surprise it was discovered that by a large majority the persons who availed themselves of the 3-cent fare were the well to do people who could well afford paying the regular rate. One of the applicants was a banker in the city, a man of large means. The president was astonished to see such a man going to the trouble to save a few cents, especially as he was a liberal man; and asked the reason. The reply was, that as a banker it was a case of business policy, and that in his position it would not do to have depositors and others doing business at his bank, see him paying more than the lowest obtainable price for his ride. Personally, he would gladly pay the 5 cents if tickets were withdrawn. The incident is rather an interesting one, though the point is, those whom the low rate is intended to relieve, are not the ones who most avail themselves of the reduction.

ELECTRIC FIRE ENGINE.

One of the largest installations for supplying electrical power for factory purposes in England is that of Siemens' Bros. The plant occupies $6\frac{1}{4}$ acres of ground, the



ELECTRIC FIRE ENGINE.

various buildings covering about 5 acres. Many electrical devices are in use, among them an electric fire engine, built in regular style, except that the pumps are operated by electricity. It is capable of throwing a 1-inch stream of water 80 feet high, or two such streams about 65 feet. Current is obtained by coupling to plug contacts built in iron columns, which resemble hydrants. The illustration is from the *Electrician*, London.

SOWING OATS.

An amusing story is told in connection with the wonderful traction performances of the big electric locomotive in the B. & O. tunnel at Baltimore, which has not received the publicity that some of its other performances have. The electric locomotive has persistently insisted on pulling any load the B. & O. officials have seen fit to put upon it, and the limit of the trains it can pull seems to be governed more by the strength of the rolling stock than by the power of the locomotive. One day a tremendous load was attached and was being hauled with the usual dispatch when a decrepit old car of oats in the front of the train, could stand it no longer, broke in two in the middle, gave up the ghost and gave down its load of oats, sowing it along the tunnel. We are inclined to think that the B. & O. officers have about come to the conclusion that the electric locomotive is nearly strong enough for everyday purposes.

Poles for the trolley lines at Stuttgart and Pankow, Germany, were made by the Mannesman Tube Company, which is introducing the wonderful Mannesman process of tube making.

RETIRED AFTER 36 YEARS.

James T. Gorman, who has been connected with the Philadelphia Traction Company and leased lines for 36 years, most of the time as general superintendent, has resigned. He is nearly 56 years old, and thinks he has earned a long rest. When he was 20 years old Mr. Gorman secured employment with the West Philadelphia Passenger Railway in September, 1859, as assistant to his father, John L. Gorman, who was assistant superintendent. The line had been placed in operation the year previous with 20 cars and 144 horses. The cars were quite small even when compared with the most recent style of horse car used by the company. A few of the original horse cars are in use today as sand cars.

Upon the death of Mr. Gorman, senior, in 1866 his son succeeded him. In 1881 when P. A. B. Widener and William L. Elkins bought the company, Mr. Gorman was made general superintendent, and when the Philadelphia Traction Company leased the West Philadelphia and Union Companies, he was appointed general superintendent of the traction company, holding the position until the recent consolidation, although he sent in his resignation last winter, on account of ill health, but was compelled to withdraw it.

Mr. Gorman has many reminiscences regarding the old horse car days. He was one of the best judges of horses in the city, having bought during his career 25,000 horses. His wide experience gave him a practical knowledge of veterinary medicine, which was supplemented by the study of the best authorities. He introduced the custom of giving exhausted horses shower baths in hot weather, which has been adopted everywhere, in spite of the protests of veterinarians at the time that it was sure death to over heated horses. The efficacy of this treatment was discovered one hot day during the Centennial when an exhausted horse was permitted to stand out in a thunder shower.

When Mr. Gorman went with the company, it owned 144 horses. During the Centennial the service required 1,325, but when electric traction was adopted, there were 4,800. During the Centennial 200 horses died from the effects of the heat. The epizootic epidemic of 1872, which will always be remembered by street railway men, who were in the business at that time and by horse owners generally, caused a great deal of mortality among the horses of the company. The horses went around with their throats wrapped in red flannel. A man stood at the stable door with a bucket of tar, belladonna and liquorice. With a small syringe he gave each horse a dose as he came out ready to take a car. Cars were run by horses except on very damp days, when they were kept in the barn for their own good. On those days a long line of men would pull a car by means of a rope, charging 25 cents for each passenger, in this way they were able to earn fair wages.

Probably the first street railway express service was inaugurated by the West Philadelphia Company, which ran immigrant cars from the Delaware river to West

Philadelphia, carrying the newly arrived immigrants with their collection of boxes and bundles. In war times "train cars" were operated, which were held on a siding to meet trains.

THE DELIGHTS OF FOREIGN TRAMS.

H. H. Littell who spent considerable time the past summer inspecting the street railway systems of Europe returns fully imbued with the superior advantages furnished the public here.

"I don't want to brag about my own offspring, as it were, but I do say that if other Buffalonians could go abroad and see how much we excel the tramway, the heavily-laden, the slow-moving, space-eating buses, they would thank the management of the Buffalo Railway Company for what it is doing.

"Take Berlin, for instance, and you will see the stages going down through Unter den Linden, through Frederick Strasse and turning into Leipsic Strasse and leaving passengers on a rainy day standing there gasping. When everything is 'complet' in Paris no more will be taken on. Now, if we were to do that on the Buffalo Railway, the people would mob the office. There would be another 'Tea Party' and they would throw everything overboard. But Berlin is not nearly as bad as Paris. Going out the Rue Magdalene down near the Church of the Magdalene and down into the Rue Royal, I have seen a thousand people waiting in line with their little tickets which they got with lots of red tape from an office on the street, waiting for their turn to get up on the stage to ride to Neuilly and other points in the suburbs. Imagine our people lining up on Main street from Seneca street to Niagara street, eight and 10 deep, with checks in their hands, waiting for the railway company to take them to Black Rock and Cold Spring, two points corresponding to Buffalo as Neuilly does to Paris. They would not do it. And yet these buses are under government control and are operated, as they suppose, by very competent managers.

"Take the London buses. Come down from Piccadilly, Circus, or from Regents' street into Trafalgar Square and see the crowd of people there running for their lives from the sidewalks to the 'safety stone' in the middle of the street and looking furtively in opposite directions for a chance to get out of there in safety, and then think of what we enjoy here in Buffalo. Of course, you might say the underground system of London in a measure relieves this. So it does, if one wants to run the risk of suffocating by inhaling the noxious gases, inseparable from underground tunneling, as every civil engineer knows.

MAIL SERVICE AT DES MOINES.

George B. Hippee, general manager of the Des Moines City Railway, has adopted a new plan with reference to mail service on his cars. The postmaster asked for figures for placing mail boxes on cars, but instead of giving

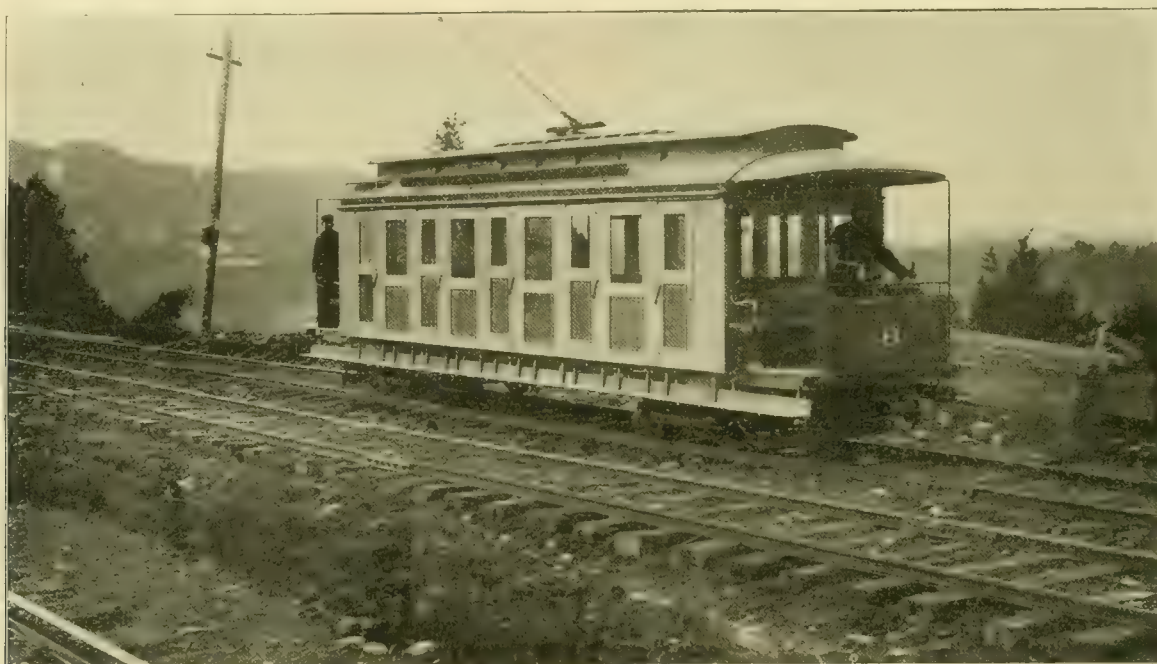
them Mr. Hippee said he would, as an experiment, equip one east, one west, one north, and one south line with boxes, and deliver all mail to the postoffice free of charge for six months. At the end of six months, if the service is satisfactory, he will present figures to the government for its continuance.

CONVERTING SUMMER CARS TO WINTER USE.

The Niagara Falls & Lewiston Railroad Company, better known as the Gorge Road, has decided to maintain a service throughout the winter between Niagara

scheme of that sort, that we would naturally wish to be fully satisfied that such engineering features outside of our jurisdiction were to be carefully worked out before guaranteeing apparatus for so high a rate of speed, although we consider it practical to build, and also that it will not be a long time before such speeds are being made by electricity, for in our opinion it is not so much a question of electrical machinery as a question of road bed. Yet, as above intimated, the statement referred to is just a trifle previous at the present time."

This statement from the General Electric Company is in accordance with the opinions of those engineers who have studied the question of high railway speeds and



NIAGARA FALLS AND LEWISTON CONVERTIBLE CAR.

Falls and Lewiston, and in order to make its patrons comfortable, the company has had several of its open cars enclosed, the sides having large windows to allow the passengers to view the delightful scenery along the route. Doors are placed on one side only, there being five to a side, which afford easy access to the seats. The cars have also been equipped with electric heaters.

MACHINERY FOR HIGH SPEED ROADS.

The statement was recently made in an article in one of the popular monthly magazines that the General Electric Company would guarantee the electrical apparatus for a railway speed of 150 miles an hour. From W. J. Clark, general manager of the railway department of that company we learn that the statement, "in the main is correct, for we are willing to build and guarantee motors, electric locomotives, generators and other electrical appliances for almost any sort of heavy railway service, high speed or otherwise; yet, when it comes to a question of a speed of 150 miles per hour, there are so many outside engineering details which enter into a

are familiar with the requirements. There is no doubt as to the present ability of our manufacturers to make electrical machinery to answer the physical requirements for such high speeds though there will probably soon be improvements which will increase the commercial feasibility of high speed roads. The main questions are those of road bed, rails, crossings, signals, clear right of way and above all commercial profit. When the civil and mechanical engineers get their part of the work ready the electrical engineers will be found prepared to meet them more than half way.

WILL CARRY EXPRESS AND FREIGHT.

The Wyandotte & Detroit River Railway has asked the boards of the townships through which its lines run for a special franchise to run cars attached to passenger coaches to carry baggage and light freight during the day, and a franchise to run special cars to carry heavy freight from 12 o'clock midnight to 4 a. m. The line runs from Detroit to Rouge River, Ecorse village, Wyandotte, Trenton and Grosse, Ile.

GLEANNED FROM THE ENGLISH SECULAR PRESS.

The traffic carried over the Kingswood electric tramway during the complete week ending Monday shows the popularity of the line, 92,516 passengers having been conveyed.

THE DEADLY HORSE CAR.

On Saturday afternoon, whilst some lads were playing in Commercial street, Newport, (near the top of Williams street), one of them, named James Sheryn, aged fifteen, living at 29 Adeline street, either fell or was pushed forward just as No. 2 tramcar was running through the siding which is placed there. There is a conflict of statements as to whether the wheels of the car actually passed over the unfortunate lad, but his injuries, however inflicted, were of the most serious nature. Both his thighs were fractured, and, in addition, one of the big bones just above the ankle was broken. He was picked up as speedily as possible, and Police-constable Peacock rendered first aid. He was conveyed to the infirmary in a cart.

CHRISTMAS BOXES.

With reference to the proposal that Christmas-boxes should be given to omnibus drivers and conductors, another correspondent adds the further suggestion that the same thing should be done for the men employed on the tramcars. "As a daily passenger on these useful conveyances," he writes, "I can fully testify to the politeness and civility of these public servants. I do not think the companies would object to boxes being placed in the 'buses and cars, but would rather encourage the idea by augmenting the amount obtained."

HORSELESS CARRIAGE RECORD.

The Hon. Evelyn Ellis has taken his carriage fitted with the Daimler motor from West Malvern to Gloucester, running the distance there (26 miles) in two hours, and doing the return, which involves a climb of 800 feet in four miles, in three hours. The rate of speed depends to a great extent on the state of the roads, but the other traffic has to be considered, and when the roads are comparatively clear of horses, &c., much quicker journeys can be made than when they are crowded. For instance, a journey that occupied two hours on one day was accomplished in 53 minutes on another, entirely due to the "clear" road. The cost of running from Datchet to Malvern (120 miles) was within ten shillings, including lubricants, and the cost would have been less but for the number of towns passed through where slow speed is necessary. The motor, it will be understood, consumes as much oil when the vehicle is going slow as when running fast. The effect on horses is reported to be very little, but some few "shy."

THE GALLOWES LIKE ERECTION.

The tramcars are elegantly fitted up, and very well lighted; and they run up hill and down at a pace quite equal to that of a fast trotting horse. On the top of each

car is an arm with a T-shaped groove at the end through which the wire passes. The gallows-like erections by the side of the road which support the wires are not things of beauty, but their appearance will, no doubt, be improved in course of time.

CARS THAT DON'T SHAKE.

The Amsterdam Tramway Company offer the following advantages:—1. Light and elegant cars, that do not shake. 2. Handsome and comfortable shelters in every part of the city. 3. Small books containing a certain quantity of tickets, available at any time, and for any route, and obtainable in the principal hotels, cafes, branch postoffices, stationers, &c. 4. Uniform rate, equal to 1¼d. of our money. 5. Driver and guard (whose wages are 30s and about 27s respectively), in neat uniform costume.

KICKS FOR THE LADIES.

To the editor of the Birmingham Post: Sir.—I should like to know whether the little island at the corner of Station street and Hurst street is intended solely for the benefit of the tramway company or the public. Passing along that way on Tuesday evening I saw a young lady fall headlong over a large hosepipe which is constantly spread over this particular spot, and at times half over the road. As this is a very busy corner I trust the tramway company will see in future that the hose is either removed when done with, or put in such a position that people cannot fall over it. I am glad to say the young lady escaped with nothing more serious than a very severe shaking.

WINDING THE BISHOP.

* * * Mr. Kneen said that supposing it did not pay to run trams on Sunday it might be a hardship to compel them to do so. The Commissioners said they should not be compelled to run at a loss. The Clerk of the Rolls proposed that they be required to run on a Sunday, cars at least nine times each way at reasonable hours. The Bishop said there were cases where Sunday traveling was a necessity, and said that he himself had been twitted with taking a cab to Douglas Head service on Sunday and all he had to say was that when a person had to address 10,000 people it was undesirable he should be winded by walking when he got there. The Governor had no objection to the clause, and on the motion of the Attorney-General a clause was inserted that trams be run on Sundays at such times as may be required by the Commissioners.

ACCIDENTS ARE DEPLORED.

Street-Car Magnate—Don't imagine for a moment, my friend, that the company doesn't deplore the loss of life that the electric cars have caused.

Citizen—I can hardly believe that it regards the loss of life as seriously as it should.

S. C. Magnate—Oh, yes it does! You don't appear to realize that every life that is lost deprives the company of just so much business!

A GLOBE TROTTING CORRESPONDENT.

W. Lodian, an American who was educated in France and Spain, and speaks several languages, is now making a circuit of the globe as correspondent for several American journals:—including the STREET RAILWAY REVIEW. He writes he found he could get on much better among the orientals by adopting their costume, shaving his head and donning a cue, and the white-soled foot gear of the celestials. Lodian is just now concluding his sojourn in



W. LODIAN

Street Railway Review Traveling Correspondent in the Orient.

the far East and is shifting northward through China and Siberia where he winters before travelling overland to Paris; a journey, most of which will necessarily have to be made on foot, and covers a distance of about 8,000 miles, penetrating districts where foreigners have never reached.

As there is supposed to be nothing new under the Asiatic sun, he will keep a sharp look out for any abandoned street railways where storage batteries, gas and ammonia motors may have been discarded several centuries ago.

The photo is by Nap & Co. of Calcutta.

CHEAP THUNDER.

An evening paper in Chicago accidentally discovered that the North Shore suburban line was about to vestibule its winter cars. With a view to glory and popular approval it prints two or three columns a day depicting the intense suffering of the motorman *ad lib* and works itself up into a frenzy of refrigeration. When it had finally exhausted all its breath and people were tired and sick of the vain repetitions, the aforesaid sheet comes out with big scareheads announcing that the country was

saved, the vestibules were actually being constructed, and all on account of the single handed efforts of this one paper, against the world. Altogether it was one of the cheapest newspaper fakes we have seen in a long time.

CARS AND SCHOOL BUILDINGS.

Managers of companies whose cars run by school buildings are vexed with the problem of avoiding running over children. The first action of the youngsters after they leave the school yard is to run for the street, as if there was no room for them on the sidewalk. The cause for this may be the dislike of children to the feeling that they are being confined. Many plans have been tried, but none of them have been successful. A tight board fence extra high comes nearest a solution, but this has its drawbacks, as some venturesome youths would be sure to find a way to climb it, and celebrate their victory by hitching on the first car to pass.

The Beverly, Mass., authorities thought to prevent accidents to school children by passing an ordinance requiring cars to slow down to a speed not exceeding three miles an hour when passing school buildings. As an additional precaution the conductors must leave their cars and walk ahead a whole block shooing the children off the track, like chickens. To obey this ordinance only makes matters worse. The cars run so slowly that the children take particular delight in jumping on, while the conductor, who ought to be on his car to keep them off, is compelled to plod his weary way to the limit fixed by the ordinance, when he waits for the car to catch up with him, only to see the boys jump off before he can get at them. The ordinance simply serves to put temptation in the way of the children, increasing the chances of accident. What should be done is to permit the cars to run at maximum speed, and place under arrest all the children found on the tracks except at crossings, where a policeman should be stationed when school is dismissed. If a sense of fear can be instilled into children and grown people too, they will take care not to get hurt.

ELECTRICITY VS. STEAM DUMMIES.

Although the economy of electricity is unquestioned for street railway traffic in ninety-nine cases out of a hundred, there are some suburban lines operating very few cars which have steam dummies and on which it is usually considered doubtful if electric traction would be cheaper. Alfred Dickinson who built the electric line which replaced steam dummies at South Staffordshire, England, states in a short article in the electric traction number of *Lightning* that the cost for fuel alone on that line last year was \$.008 cents per car mile against \$.035 for the steam dummies, so that as far as fuel is concerned there is no comparison. In addition to this he states that the repairs on rolling stock are much greater for steam. The total saving over steam was \$.06 per car mile run, to say nothing of the traffic induced by the cleaner and more pleasant method.



An electric railway is proposed between Golling and Steg, Austria.

The Gratz, Austria, Street Railway Company contemplates adopting electric traction.

The Bombay, India, Tramway Company will again extend its lines. The concern is prospering.

A trolley line connecting two railway stations in Basle has just been completed by Siemens & Halske, of Berlin.

The Allgemeine Electricitats Gesellschaft of Berlin has received a large order from Tokio for electric railway material.

A prominent citizen of Belfast was recently killed by losing his balance and falling from the top of a double-deck car in that city.

Electricity will be installed on the tramway at Port Elizabeth, South Africa, by the new owners, who paid \$100,000 for the lines.

The Rathmines, Eng., taxpayers association held a meeting recently to signify its strong approval of the proposed electric railway to the sea.

The corporation of Copenhagen intends changing its horse line to electric, purchase the other lines not owned by the city, and consolidate.

Oberammergau, of Passion Play renown, is to have an electric road if O. L. Kummer & Co., of Dresden take advantage of the franchise they have.

Horseless carriages have been placed on exhibition in England at the Tunbridge Wells Agricultural Show. The admission fee is given out in prizes for the best vehicles.

The first electric road in Berlin was recently started. It was built by Siemens & Halske and connects Gesundbrunnen with Pankow. Cars are to run on a 10 minute headway at 16 miles an hour.

A company has just been formed in Brussels with a capital of £46,000, to be known as La Societe des Tramways de Bialystok, to construct and operate a tramway in the town of Bialystok, Russia.

Cable traction is advocated for Newcastle, Eng., by Mr. Laws, the city engineer, in preference to all other systems. He estimates the cost of the 12½ miles of proposed cable line at \$600,000, not including land.

The United Tramways & Omnibus Company, Liverpool, Eng., for the 6 months ending June 30, received \$636,000 revenue, of which \$51,600 was profit. Deducting the income tax there remains a dividend of 5 per cent.

John Shaw, Jr., is promoting an electric railway between Derby and Ashbourne, Eng., to carry passengers and freight. Water power at Brailsford Brook will drive the generators which furnish current to the overhead trolley.

Compressed air cars will be constructed and operated in the town of Saint Quentin by a company formed in Brussels, Belgium, with \$200,000 capital, and known as the Societe des Tramways de Saint Quentin et du Departement de l'Aisne.

The Central London Railway Company has awarded the contract for 6½ miles of underground railway to the Electrical Construction Company, Limited. For the lump sum of \$15,000,000, the latter is to acquire the right of way, construct two separate parallel tunnels and equip the line.

Austria-Hungary is making progress with electric traction. A 9-mile railway is being constructed between Vorchdorf and Gmunden; a franchise has been granted for one between Folling and Gratz, and another is proposed between Lippa and Savanyinkut. A trolley line is being built in Fiune; Ganz & Co., of Budapest have a concession for a line in Pressburg; and plans are being drawn for one in Arad. The horse car lines of Temesvar are to be changed to electric.

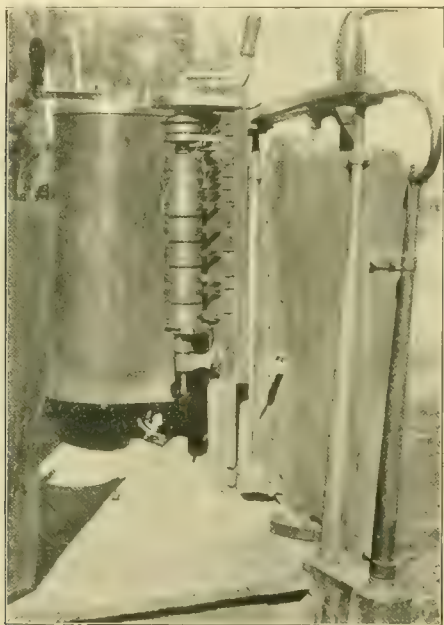
Station indicators have been placed on all cars of the Metropolitan District Railway, London. Being an underground line the desirability of indicators was early recognized and a year ago experiments were begun with ultimate satisfaction. As perfected the apparatus is entirely automatic on whatever line the cars may be running. An endless chain successively presents the name cards in a glass case hung in the ceiling. The chain is moved by a lever which hangs down below the car body and strikes upon projections in the road bed. In addition to the names of the stations there is room on the cards for advertisements.

The London Electrical Review says: Sir William Arrol has been interviewed by the Glasgow Mail with respect to the mechanical propulsion of tramway cars, which question has been before the Glasgow Corporation for some time. Sir William's opinions occupy nearly a column, but we will give the gist of them in a few words. Cable traction:—Absolutely unsuitable for Glasgow. Electric traction—overhead system:—All right for quiet straight runs in a village or suburbs, but he does not approve of it for a city like Glasgow. Mr. Johnson's oil motor system:—We referred to an excellent performance of this motor in a recent issue, but in spite of that performance Sir William, having seen the motor at work,

considers it the best motor he has yet seen for tramway purposes. He is of opinion that only one system should be adopted for the whole of the city.

SKINNER-DORLAND ELECTRIC BRAKE

E. B. Skinner and Robert R. Dorland of the Ogden City Street Railway have been at work for several years on an electric brake and have now got it in successful operation on one of the Ogden cars. It is a solenoid brake



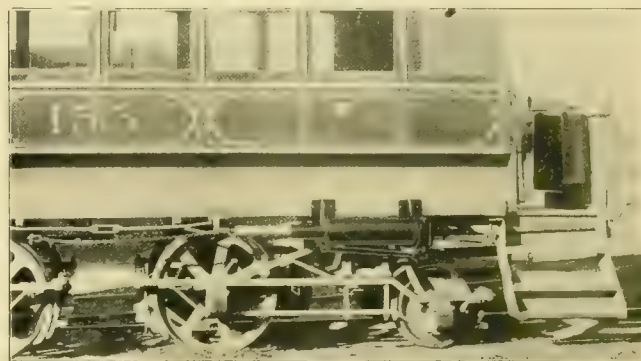
CONTROLLER FOR ELECTRIC BRAKE.

operated from the trolley current but the controller for the brake has contacts so that in case of emergency when the trolley comes off the brake may be applied by the motors acting as dynamos. The solenoid, which takes the place of the air cylinder on an air brake is a coil and plunger with coil 3 inches inside diameter and windings 2 inches thick. Its length is 24 inches. The magnetic circuit is made complete by putting an iron case around the coil. This is essential to the success of the invention. The next important detail is the auxiliary device for keeping the brake set without use of current. A small mag-

net works a clutch which can be released or set by the movement of the controller handle from one point to another, so that except when the brake is being drawn tighter no current is used. The controlling stands are similar to car controlling stands except that they are smaller as they do not have to carry so large a current. Our engravings show it as applied to a car in Ogden.

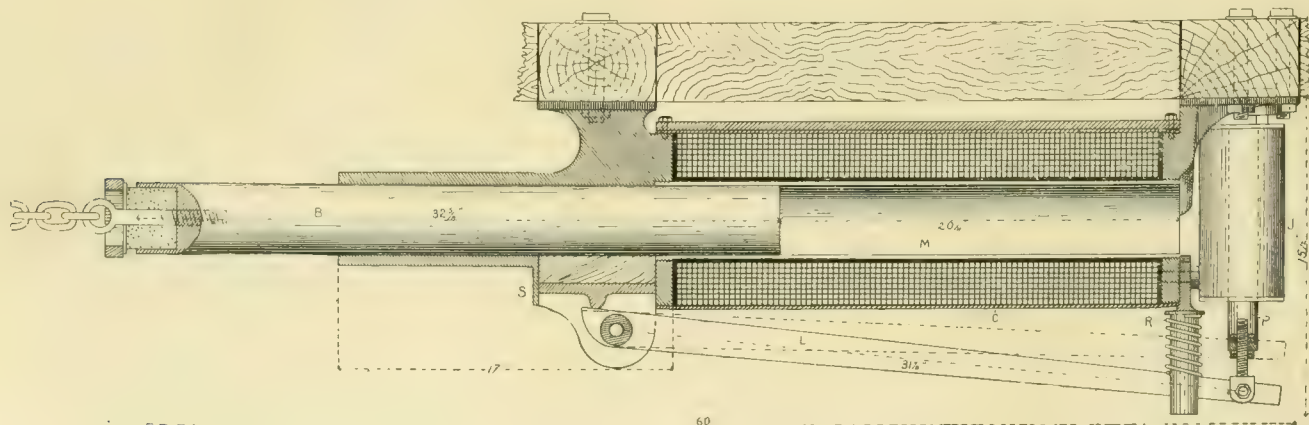
NEW TYPE OF ELECTRIC ROAD.

Electric railways for the most part have in view the possibilities of passenger traffic, when they are being organized, making a freight and express service of secondary importance. In Hoboken, N. J., is a project that has for its primary object a freight service, and may make no effort to secure any revenue from passengers, although it has a very liberal franchise, which permits it to do anything it may desire. The franchise is owned



SKINNER-DORLAND ELECTRIC BRAKE.

by the Hoboken Railroad, Warehouse and Steamship Connecting Company, which will construct an electric road from the steamship docks to the Junction and the Erie Railroad Companies. The completion of the line will enable the West Shore Railroad to handle the bulk of the western business for the steamship lines. The owners of the franchise believe an electric road will be more feasible for transferring freight than a steam road would be, so they have made arrangements to adopt it. This will be the first road of the kind to be built.



PLAN OF SKINNER-DORLAND ELECTRIC BRAKE.

NEWS FROM THE CITIES

Arizona.

PHOENIX, ARIZ.—Lincoln Parlor has been granted a franchise for a street railway.

California.

SANTA ROSA, CAL.—J. D. Cooper has leased the Central Street Railway.

SAN FRANCISCO, CAL.—The Market Street Railway will issue from \$800,000 to \$1,200,000 in bonds.

PASADENA, CAL.—W. D. Larrabee has been granted a franchise for an electric road from Pasadena to Altadena.

LOS ANGELES, CAL.—The Los Angeles Street Railway will issue \$3,000,000 of bonds and extend its system in all directions.

SAN FRANCISCO, CAL.—The San Francisco & San Mateo Electric Railroad Company will extend its park branch to Ingleside.

SAN BERNARDINO, CAL.—It is reported that F. Kohl, Centralia, Ill., has bought the Harlem motor line, which runs to Harlem springs.

HALF-MOON BAY, CAL.—W. H. H. Hart is president of a company that proposes to build an electric line from Santa Cruz to San Francisco.

SAN JOSE, CAL.—The Board of Trade committee—J. F. Thompson, chairman, and J. P. Fay, secretary—reports all the stock subscribed for the Saratoga Electric Railway.

OAKLAND, CAL.—Felix Chapplet, of Oakland, and D. Chisholm, of Haywards, will build 36 miles of electric railway from Haywards to Alvarado. Connection will be made with the Oakland, San Leandro & Haywards system.

Canada

HALIFAX, N. S.—The Halifax Electric Tramway Company has given a mortgage of \$600,000 to the Eastern Trust Company, Boston.

POGAMASING, ONT.—A project is on foot for the construction of an electric railway line from Pogamasing to Riscotasing, Ont., for the convenience of cullers.

PEMBROKE, ONT.—The people of Pembroke are agitating for an electric railway to connect their town with Beachburg, Forester's Falls, Westmeath and Eganville.

BELLEVILLE, ONT.—The Belleville Traction Company has been incorporated with \$100,000 capital to construct an electric street railway by S. A. Lazier, T. C. Lazier, R. C. Lazier.

QUEBEC, QUE.—J. Arthur Maguire, consul general here for the Argentine Republic, is interesting Canadian capitalists in a proposed electric road for Buenos Ayres. Franchises have been secured.

RENFREW, ONT.—Negotiations are in progress for an electric road between Renfrew and Portage du Fort. The distance is eight miles, and water-power will generate the electricity. A. C. Wright, of Renfrew, is interested in the project.

TORONTO JUNCTION, ONT.—The Toronto Suburban Street Railway Company, Limited, will construct four miles of electric road in the spring. R. Wilson Smith is president and R. H. Fraser is secretary, treasurer and general manager.

Chicago.

CHICAGO.—The Chicago & Jefferson Urban Transit Company has filed a mortgage for \$2,000,000.

CHICAGO.—The Chicago City Railway will increase its capital \$2,000,000, making the total capital \$12,000,000.

CHICAGO.—Marcus C. Gormley has filed a bill in the circuit court asking for a receiver for the General Electric Railway Company.

CHICAGO.—The report that the North Chicago Street Railroad would soon issue an additional \$2,000,000 of stock is denied by Mr. Yerkes.

CHICAGO.—A. M. Searles, 236 S. Oakley avenue, is interested in the construction of an electric railway from Charleston, Ill., to Mattoon.

CHICAGO.—The Calumet Electric Street Railway Company has been granted a franchise for 16 miles of additional road, and will begin work as soon as practicable.

CHICAGO.—The directors of the Chicago General Railway Company have approved the trust deed for \$10,000,000, and authorized the purchase of five 40-foot cars with double equipment of 50-horse-power motors.

CHICAGO.—The Northwestern Elevated Railroad is receiving bids for 8,505,000 feet of yellow pine timber. Delivery is to be at New York by April 1, where the timber will be vulcanized, and arrive in Chicago by June 1.

CHICAGO.—The Chicago City Railway is securing consents for an electric line in Dearborn street, from Lake to Thirty-second streets, thence west, connecting with the lines on Union and Princeton streets, giving four parallel north and south lines to the business center, and effectually shutting out competition. The North Chicago Street Railroad will use the tracks on Dearborn street, from Lake to Polk streets, which are owned jointly by the two companies.

Connecticut.

HARTFORD, CONN.—An electric line to Rockville is being projected.

NEW LONDON, CONN.—The New London Street Railway will extend its tracks to Waterford.

WATERBURY, CONN.—The Waterbury Traction Company will extend its line three miles to Waterville.

MERIDEN, CONN.—The Meriden, Waterbury & Connecticut River Railroad will be converted to electricity.

NORWALK, CONN.—The Norwalk Tramway Company has secured a franchise from New Canaan, and will extend its line.

MIDDLETOWN, CONN.—Citizens of East Berlin are making efforts to have the Middletown Horse Railroad Company extend its lines.

STAMFORD, CONN.—The Stamford Street Railway has applied for franchises for several miles of extensions and to double track its road.

MONTVILLE, CONN.—The Montville Electric Railway Company has had its routes in Montville approved, and has applied for a franchise in Norwich.

MONTVILLE, CONN.—The town of Norwich has approved of the plans of the Montville Electric Railway Company, and work will soon begin.

SHELTON, CONN.—The Shelton Street Railroad Company has been incorporated with \$25,000 capital to connect with the Derby Street Railway. Gen. Thomas L. Watson, Bridgeport, president; Allan W. Paige, Bridgeport, secretary; directors, W. J. Miller, D. S. Brinsmade, Shelton; W. S. Downs, Derby.

NEW HAVEN, CONN.—The city authorities have asked the board of Railroad Commissioners to order trolley cars equipped with fenders. This is the first petition brought under the law of 1895 authorizing the commissioners to order trolley cars equipped with fenders, if, in their judgment the safety of the public is involved.

MILFORD, CONN.—General G. H. Ford, ex-Sheriff Charles A. Tomlinson, ex-Judge William B. Stoddard, ex-Senator George M. Gunn, ex-Representative Tibbals, and Charles W. Beardsley, New Haven, are organizing a company with \$100,000 capital to build 8 miles of electric road, connecting Naugatuck Junction, Milford, Woodmont and Woodmont Station.

WINDSOR LOCKS, CONN.—Meetings are being held in the interest of the Windsor & Suffield Tramway Company, incorporated with \$50,000 capital to build an electric line from Windsor Locks to Suffield, Poquonock and Rainbow. David Henney, president of the Hartford & West Hartford Horse Railway Company, Hartford; H. C. Douglas, Windsor Locks; William R. Hurd, Bristol; P. H. Quinn, Hartford, are interested

Colorado.

DENVER, COL.—The Denver Tramway Company has applied for franchises for extensions.

GLOBEVILLE, COL.—The Denver, Globeville & Golden Rapid Transit Company has secured its right of way in Denver and Globeville and will construct its line in the spring.

BOULDER, COL.—The Western Electric Traction & Power Company has been incorporated to operate in Jefferson, Boulder and Grant counties. Capital, \$100,000; incorporators, E. B. Goodwin, W. K. Mehollin, John Leahy, John Kline, Bernard Mallon, Oliver I. Cheney, A. J. Macky and H. J. Danford.

District of Columbia.

WASHINGTON, D. C.—The District of Columbia Suburban Electric Railway will apply to congress for a charter. The last congress passed a bill, but it did not reach the president in time to become a law. The Maryland franchises have been secured, and the road will run from Rives Station through Bladensburg and Hyattsville to Riverdale Park, Dr. C. A. Wells, Hyattsville, Md.; B. D. Stephen and J. A. Blundon, Riverdale Park, Md., are directors.

Florida.

PENSACOLA, FLA.—Sterrett Tate has applied for an electric railway franchise.

ORLANDO, FLA.—The Orlando Street Railroad Company has been sold to M. P. Eliot.

JACKSONVILLE, FLA.—J. F. Eldridge, treasurer of the town of Orange Park, says a company is organizing to build 13 miles of electric road from this city to that suburb.

Georgia.

BRUNSWICK, GA.—The Brunswick Street Railroad Company may be soon equipped for electric traction.

Illinois.

POTOMAC, ILL.—The Businessmen's Association is working hard for a street railway.

ALTON, ILL.—The Alton Railway & Illuminating Company is figuring on several extensions this winter.

ELGIN, ILL.—The Carpentersville, Elgin & Aurora Railway Company has been granted a franchise for a double track.

LITCHFIELD, ILL.—A receiver has been appointed for the Litchfield Car Company. Assets, \$75,000; liabilities, \$168,000.

OTTAWA, ILL.—The General Electric Company bought the Ottawa Electric Railway for \$7,500 subject to other indebtedness.

KANKAKEE, ILL.—The North Kankakee Electric Light & Railway Company will extend its line to Riverview and Bourbonnais caves.

PEORIA, ILL.—E. J. Darst, promoter of the Peoria & Pekin Electric Railway, says the locating at Bartonville of an asylum will enable the construction of the road to begin.

PEORIA, ILL.—The Central Railway Company, the consolidation of the electric lines, has issued \$750,000 in bonds, and increased its capital to \$750,000. New cars have been ordered, and contracts for rail, ties and other material will be let in January. Walter Barker is president.

Indiana.

FT. WAYNE, IND.—The Ft. Wayne Electric Railway Company has purchased the Lakeside line.

FT. WAYNE, IND.—The Ft. Wayne Electric Railway Company will extend its lines ten miles to Cedarville and Leo.

INDIANAPOLIS, IND.—T. J. Smith, Indianapolis, is promoting an electric road in Henry county, to connect New Castle, Cadiz, Greensboro and Knightstown.

NEW ALBANY, IND.—Judge Cardwill, Adam Heimberger, Charles B. Dorsey are a committee of the Commercial club to meet like committees from other cities with a view to securing a street railway.

GOSHEN, IND.—The Indiana Electric Railroad Company, operating in Goshen and Elkhart, has filed a mortgage for \$500,000, in favor of the Royal Trust Company, Chicago. The money will be used to construct an interurban line and for additional equipment.

NEW ALBANY, IND.—The Highland Railroad Company has been re-organized, and will be taken out of the receiver's hands. The capital of the new company is \$25,000; directors, Henry Terstegge, John H. Shrader, Jacob Zinsmeister, Charles Schwartzel and George L. Tuley.

ANDERSON, IND.—C. L. Henry will receive bids on December 8 for the construction of the Henry Gas Belt Electric Railway, which, when completed, will connect Indianapolis, Anderson, Muncie, Marion, Elwood, Alexandria and other towns in the gas belt. The equipment will be heavy.

ANDERSON, IND.—It is reported that C. L. Henry and Noah J. Clodfelter have combined their interests in proposed interurban roads. Stephen Metcalf has retired as manager of the Anderson Electric Street Railroad Company, and is succeeded by T. J. McMahon, of the National Exchange bank. Ellis Carpenter is secretary.

VALPARAISO, IND.—S. S. Kimball, vice-president Chicago Hydraulic Pressed Brick Company, 301 Chamber of Commerce, Chicago; Delos Phelps, room 15 U. S. Government building, Chicago; H. B. Darling, Boston, and the Porter Land Company, Porter, Ind., are reported to be interested in a project to construct an electric line from Valparaiso to Porter, Chesterton and Flint Lake.

Iowa.

SIoux CITY, IA.—The Sioux City Traction Company has been granted extensions.

DES MOINES, IA.—The Des Moines City Railway Company, George B. Hippee, general manager, will at once double the capacity of its power plant.

SIoux CITY, IA.—The Central Traction Company will succeed the Sioux City Cable Railway Company with \$500,000 capital. Improvements will be made. C. M. Swan is president, and Howard S. Baker, secretary and treasurer. Mr. Baker will be general manager.

SIoux CITY, IA.—The South Sioux City Traction Company has been incorporated by H. J. Taylor, F. L. Eaton, E. A. Burgess, D. L. Plummer and C. A. Benton, to consolidate the various lines in the city. Two lines of road will be built from South Sioux City across the Missouri river bridge.

DUBUQUE, IA.—It is reported that the Old Colony Trust Company will, on December 10, move for the discharge of the present receiver of the Dubuque Light & Traction Company and foreclose the first mortgage. There are certain claims that may have priority to the mortgage which may interfere with the discharge.

Kansas.

EMPORIA, KAN.—J. O. Patterson has been granted a franchise for an electric line.

PITTSBURG, KAN.—The Broadway electric line has been sold to the Frontenac Suburban Railway Company.



THE OLD HORSE, THE HORSELESS CARRIAGE AND THE ELECTRIC CAR.

Kentucky.

HOPKINSVILLE, KY.—I. C. Adair, Fordsville, has applied for a street railway franchise.

FRANKFORT, KY.—George B. Harper has been appointed permanent receiver of the Capitol Street Railway.

LOUISVILLE, KY.—Labor organizations are making strong efforts to induce the Louisville Railway to put conductors in its cars.

Louisiana.

NEW ORLEANS, LA.—Isidore Newman, the banker, has offered stockholders of the New Orleans & Carrollton Railroad 130 for their holdings, on behalf of eastern capitalists. The system will be developed and attractions created along the line.

Maine.

PORTLAND, ME.—The Portland Railroad will probably extend its line to Allen's Corner and Pleasant Hill in Falmouth.

ORONO, ME.—The Bangor, Orono & Old Town Electric Railway may build a power-house, as the water power has failed in many instances.

BATH, ME.—It is reported that the New England Traction Company is after franchises for an electric road to Little lake, Soldier's home and Hammondsport.

BANGOR, ME.—The Bangor & Winterport Railway Company has a franchise pending. Gen. Henry L. Mitchell, Smith block, is the promoter, and says work will begin soon.

SKOWHEGAN, ME.—The Colburn Agency is considering the feasibility of building an electric logging road 10 or 12 miles in length. The agency has 200,000 acres of timber land and 30,000,000 or 40,000,000 feet of timber in one locality that is very difficult to get out in the usual way by driving down the streams; and also has a water power with 40-foot head, to furnish the power. Turner Buswell, agent, Skowhegan, Me., has the matter in charge.

Maryland.

FREDERICK, MD.—The Frederick-Middletown Electric Railway will soon let contracts for grading.

BALTIMORE, MD.—The City & Suburban Railway Company will build an iron car-house at Irvington.

BALTIMORE, MD.—The City & Suburban Electric Railway will test electric and air brakes on its Catonsville branch.

BALTIMORE, MD.—The Baltimore & Gunpowder Railway Company has been granted a franchise for 14 miles of electric road.

HAGERSTOWN, MD.—E. K. Sponsier, Harrisburg, Pa., the promoter of the Hagerstown & Potomac Electric Railway, says construction on the line to Funkstown will soon begin.

BALTIMORE, MD.—On November 25 the application of certain stockholders will be heard for a receiver for the Edmondson Avenue, Catonsville & Ellicott City Railway Company.

HAGERSTOWN, MD.—George B. Oswald is chairman, and W. H. A. Hamilton, secretary, of the committee on stock subscriptions of the Hagerstown City Passenger Railway Company.

HAGERSTOWN, MD.—The Harrisburg Construction Company has secured the contract for the Hagerstown & Potomac Electric Railway in Hagerstown and the Williamsport and Funkstown extensions.

HAGERSTOWN, MD.—The franchise of the Hagerstown & Potomac Railway Company has been approved by the mayor. The new local directors are A. J. Eyerley, J. H. Blake, P. J. Mayberry, McKinley P. Embrey.

CONOWINGO, MD.—The Susquehanna Construction Company has been incorporated, with \$100,000 capital, to construct the plant for furnishing electric power to Baltimore. Incorporators, J. Wesley Kerr, Otto J. Fischer, John Henry Miller, George K. McGaw, F. Murdoch.

Massachusetts.

HOLYOKE, MASS.—The Holyoke Street Railway will double-track its line for 3,000 feet.

QUINCY, MASS.—The Quincy & Boston Street Railway will be extended to Holbrook next spring.

FITCHBURG, MASS.—The Fitchburg & Leominster Street Railway has received additional franchises.

MILFORD, MASS.—The Milford, Holliston & Framingham Electric Railroad will build a power-house.

NORWOOD, MASS.—The Norfolk Central Street Railway has an application for a franchise before the selectmen.

LOWELL, MASS.—The Lowell & Suburban Railway will extend its system to Tewksbury, Andover and Wilmington.

SHREWSBURY, MASS.—The Shrewsbury Street Railway Company has applied for a franchise. S. F. Shaw, Shrewsbury, is interested.

WORCESTER, MASS.—It is reported that the Worcester & Suburban Street Railway and the Consolidated Street Railway will be united.

BEVERLY, MASS.—The Beverly & Danvers Street Railway will be equipped for electric traction. Cars and other equipments are wanted.

HAVERHILL, MASS.—The Haverhill & Danvers Street Railway Company is contemplating an extension from Putnamville to Asbury Grove.

QUINCY, MASS.—The Quincy & Boston Street Railway Company will build an extension next spring between South Braintree and Randolph.

DIGHTON, MASS.—The Dighton, Somerset & Swansea Street Railway Company has increased its capital by \$65,000, and will issue \$125,000 in bonds.

BOSTON, MASS.—The Harbor and Land Commissioners have approved plans of the Rapid Transit Commissioners for a bridge to Charlestown at a height of 23 feet above high water.

SHELburne FALLS, MASS.—Herbert Newell, David W. Temple, Shelburne; C. A. Marcy, James C. Deane, Colrain; Albert J. Amstein, A. C. Bray, Buckland, are interested in a proposed electric road to Colrain, 7 miles.

NORTHAMPTON, MASS.—The Northampton Street Railway Company will probably extend its line to Amherst. At the local election, petitions were circulated to that end, and received the signatures of a large majority of the voters.

WAKEFIELD, MASS.—The Peabody, Lynnfield & Wakefield Electric Street Railway Company has been incorporated with \$50,000 capital, to build 10 miles of electric road, by B. W. Russell, Thomas H. Johnson, Salem; J. M. Danforth, Lynnfield; E. P. Shaw, Newburyport.

SHELburne, MASS.—H. Newell, Andrew Sauer, Albert J. Amstein A. W. Ward and 520 other citizens have asked the legislature to incorporate the Shelburne Falls & Colrain Street Railway Company. The road when completed, will connect Shelburne, Buckland and Colrain.

RANDOLPH, MASS.—The Randolph Street Railway has revived, with Dr. A. L. Chase, John B. Thayer, John R. Graham, Franklin W. Hayden, Rufus A. Thayer, John F. Merrill and Josiah Quincy, directors. A new franchise has been applied for in lieu of the one that has expired.

NEWTON, MASS.—The Newton Traction Company has been incorporated under the laws of New Jersey. Capital, \$1,000,000; incorporators, Horace B. Parker, of Newton; John J. Toffey, of Jersey City; Lewis Pfingst, of Boston; Mark P. Hillyer, of New York, and J. Otis Wardwell and J. S. Rusk, of Boston.

HAVERHILL, MASS.—The Haverhill, Georgetown & Danvers Street Railroad Company has been reorganized, with Walter M. Brewster, Georgetown, president; James F. Shaw, Newburyport, treasurer; Edward B. Fuller, secretary; directors, Warren W. Potter, John A. Gale, Haverhill; A. S. Patton, H. L. Pierce, Leominster; Frank E. Lowe, Greenfield.

BOSTON, MASS.—W. H. Lincoln, Leyland Steamship Company; W. A. Boland, Alfred D. Chandler, William I. Bowditch, Dr. Channing, Hon. M. P. Kennard, Thomas Gaffield Anson M. Lyman, Brookline; George F. Bouve, treasurer Bouve, Crawford & Co., Boston; Samuel Jackson, Newton, are interested in a proposed electric line connecting Boston, Newton and Brookline.

Michigan.

DETROIT, MICH.—The Detroit Railway has issued \$1,800,000 in bonds.

PORT HURON, MICH.—The City Electric Company will extend its lines next season.

PONTIAC, MICH.—The Pontiac & Sylvan Lake Electric Railway has sold \$40,000 worth of bonds.

ANN ARBOR, MICH.—The Ann Arbor Street Railway Company will abolish conductors and put in fare boxes.

GRAND RAPIDS, MICH.—The Consolidated Street Railway Company has been granted a franchise for extensions.

LANSING, MICH.—The Lansing City Electric Railway Company will extend its line, in the spring, to Leadler's Park.

BENTON HARBOR, MICH.—J. S. Clark, Chicago, has been granted a franchise for an electric railway to Eastman Springs.

LANSING, MICH.—The Lansing City Street Railway Company has filed a mortgage for \$100,000 in favor of the Continental Trust Company, New York.

LANSING, MICH.—Col. Saviers, St. Louis, Mich., is organizing a company to construct an electric road, connecting St. Louis, Mich., Ithaca, St. Johns and Lansing.

ECORSE, MICH.—Hyacinthe C. Burke, Ecorse; Charles W. O'Brien and Stanton Marke, Detroit, have been granted a franchise for the Ecorse Central Electric Railway Company, which will build 8 miles of road to the Monguagon township line.

ALLEGAN, MICH.—The Allegan Electric Railway has been organized to build from Otsego to Allegan and Saugatuck. S. E. Makin is president; Frank Semon, vice-president; S. E. Ranney, Chicago, secretary; Samuel Clark, treasurer.

MONROE, MICH.—Starkey & Elles, 6 Wall street, New York city, will construct the Monroe Electric Railroad Company. Next year the line will be constructed to Dundee. W. H. Cowles, Monroe, is president, and L. E. Walkins, 30 Court street, Boston, chief engineer.

DETROIT, MICH.—B. B. Coursins and others have been granted a franchise by Erie township, Macomb county. It is supposed this is a portion of the right of way required by the Lakeside and Traction Company which is to build through from Detroit to Mt. Clemens via Grosse Point.

ANN ARBOR, MICH.—The Ann Arbor Street Railway Company, John Winter, president and general manager, box 116, Ann Arbor, Mich., wants one-half mile of 35 to 45-pound girder rail, that would make one mile of straight rail; also, a few good points, mates and frogs for curve work of 50 to 60 feet radius. Good second-hand material would suit.

Minnesota.

MANKATO, MINN.—C. L. Alleman and S. R. Snow will apply for a franchise for a street railway and lighting system.

TOWER, MINN.—The city has revoked the charter and taken possession of the rails and rolling stock of the Tower & Soudan Railroad.

MINNEAPOLIS, MINN.—Thomas Lowry has offered to build an interurban line to the Midway district for \$35,000 bonus. It is reported that \$25,000 has been raised.

Missouri.

KANSAS CITY, Mo.—The Westport & Waldo Railway Company has applied for a franchise.

KANSAS CITY, Mo.—The Metropolitan Street Railway will construct a line on Lafayette avenue, Kansas City, Kan.

ST. LOUIS, Mo.—It is reported that the Suburban Railway has acquired the Manchester Electric Railway and the St. Louis & Meramec River Railway.

KANSAS CITY, Mo.—The sale of the Kansas City & Independence Rapid Transit Company to C. F. Morse, president of the Metropolitan Street Railway Company for \$600,000 has been approved.

LEBANON, Mo.—Edmon E. Crebs, a banker of Fairfield, Ill., has bought the Lebanon Light & Water Company for \$20,000, including the electric light, water and electric railway properties, the Gasconade hotel and real estate.

KANSAS CITY, Mo.—T. J. Fry says the West Side Street Railway has secured the frontage for 15 miles of double track, and will apply for a franchise at the next council meeting. A section of the line will be built as soon as the franchise is granted.

KANSAS CITY, Mo.—The Metropolitan Street Railway is preparing plans for a large power station near Riverview. Plans are also being made for changing the motive power of the Fifth street line and all the cable lines of Kansas City, Kan., to electric. An electric line will be constructed in Twenty-fourth street.

ST. JOSEPH, Mo.—The St. Joseph, Railway Light, Heat & Power Company has succeeded the St. Joseph Traction & Lighting Company, with \$3,500,000 capital. The leading stockholders are William M. Hariman, Camile Weidenfeld, New York; George D. Pitton, Plainfield, N. J.; Alfred Deckers, South Orange, N. J.; R. A. Brown and W. T. Vanbrunt, St. Joseph, Mo.

Nebraska.

BEATRICE, NEB.—The Beatrice Rapid Transit & Power Company and the Beatrice Light & Power Company have consolidated, with \$1,000,000 capital, as the Beatrice Electric Company. The officers are: John A. Horbach, president; John E. Smith, vice-president; A. S. Maxwell, secretary; Paul W. Horbach, treasurer. The line will be extended.

New Jersey.

FREEHOLD, N. J.—There is a project for an electric railway to Tinton Falls.

WEST ORANGE, N. J.—The South Orange & Maplewood Street Railway Company has been granted a franchise.

ASBURY PARK, N. J.—William L. Dayton has been appointed receiver of the Asbury Park & Belmar Street Railway.

HOBOKEN, N. J.—The New Jersey Electric Railway Company, which runs to Singac, has issued scrip to meet half its interest.

HOBOKEN, N. J.—The Hoboken Railroad, Warehouse & Steamship Connecting Company has been granted a franchise for an electric road.

POINT PLEASANT, N. J.—J. H. Wainright, Manasquan, has been appointed receiver of the South Jersey Street Railway Company. The liabilities are \$145,000, with assets \$50,000.

NEWARK, N. J.—A receiver has been appointed for the Union Traction Company for a debt of \$166.66 for rent. The company was organized to build an electric line connecting Newark, Kearny, Union township and Hackensack, and the right of way was all secured, but nothing was done.

WEST ORANGE, N. J.—The Orange Mountain Traction Company has been incorporated with \$150,000 capital by Walter G. MacFarland, Leonard G. Dodge, Philadelphia; William S. Hood, Camden. The main office of the company, which succeeds the Orange Mountain Cable Company, is in Philadelphia.

New York.

BUFFALO, N. Y.—The Crosstown Railway Company has petitioned for franchises.

TROY, N. Y.—The Troy City Railway has been granted two franchises for extensions.

NEW YORK, N. Y.—The Metropolitan Traction Company has leased the Eighth avenue line.

NEW YORK, N. Y.—The Metropolitan Traction Company is about to construct two cross-town lines.

BATAVIA, N. Y.—A. B. Wilgus has been granted an extension until August 1, 1896, of his franchises.

ONEIDA, N. Y.—The Oneida Railway Company will extend its line to Sylvan Beach on Oneida Lake.

BUFFALO, N. Y.—The Buffalo Traction Company, Tom Johnson's company, has secured its franchise.

SYRACUSE, N. Y.—W. F. Randall has located the line for the proposed electric railway at East Branch.

GREENBUSH, N. Y.—The Albany, Greenbush & Bath Railway Company and the Albany Railway have applied for franchises.

NEW YORK, N. Y.—The Columbus & Ninth Avenue Railroad Company has been absorbed by the Metropolitan Traction Company.

MT. VERNON, N. Y.—The Mt. Vernon Railroad Company will adopt electric traction and extend its lines to White Plains and New Rochelle.

NEW YORK, N. Y.—The Metropolitan Traction Company has leased the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad.

NEW YORK, N. Y.—The People's Traction Company will build extensions, as shown in the certificate recently filed with the secretary of state.

PEKIN, N. Y.—Lewis T. Payne, of Pekin, is promoting a project for constructing 10 miles of electric road connecting Ely, Erie, Sanborn and Pekin.

BROOKLYN, N. Y.—The Brooklyn Heights Railroad Company will build a \$50,000 power-house on Manhattan avenue, near Box street, Greenpoint.

KINGSTON, N. Y.—The Colonial City Electric Railway will be sold December 12, at receiver's sale, to satisfy a claim of \$170,000, for principal and interest.

HAMBURG, N. Y.—Daniel W. Allen, Buffalo, says his line is completed from Limestone Hill to Beasdel, and will be extended to Hamburg in the spring.

ALBANY, N. Y.—It is reported that the Albany Railway and Cohoes City Railway will be connected in the spring, and a freight and express service inaugurated.

BROOKLYN, N. Y.—C. L. Rossiter, president of the Brooklyn Heights Company, has been elected president of the Brooklyn, Queen's County & Suburban Railroad Company.

PORT RICHMOND, S. I.—It is reported that the Midland Railroad Company has leased the Port Richmond & Prohibition Park Electric Railway Company for five years.

WATERTOWN, N. Y.—J. Addison Lawyer, treasurer of the Rome, Watertown & Ogdén Railroad, has been appointed receiver of the Watertown & Brownville Street Railroad.

LOCKPORT, N. Y.—F. H. Reed, largely interested in the Lockport City Electric Railway, says an electric road will be built to Olcott next season, and additional track laid in Lockport.

BROOKLYN, N. Y.—The Brooklyn City Railroad Company, Brooklyn Heights Company and Brooklyn City & Newtown Railroad Company have applied for franchises over 200 miles of streets.

NIAGARA FALLS, N. Y.—Hathaway & Buel, Gluck building, and H. H. Hayden, New York, are organizing a company to construct an electric road to Sanborn, Wilson, Lockport and Youngstown.

NEW YORK, N. Y.—The Third Avenue Railroad Company secured the King's Bridge franchise for 38½ per cent of gross receipts for first five years, and 5 per cent thereafter, and a cash bonus of \$250,000.

HOPKINSVILLE, N. Y.—I. C. Adair, of Fordsville, has made an informal application for an electric railway franchise. He says John McHenry, a banker of Hartford, Conn., is also interested in the project.

NEW YORK, N. Y.—It is reported that the Forty-second Street & Boulevard Railway has been leased by the Metropolitan Street Railway Company, and that some form of mechanical traction will be adopted.

WATERTOWN, N. Y.—The Sheriff seized the office furniture of the Watertown & Brownville Street Railway, to satisfy three judgments and the property was bid in by D. C. Middleton, who had a judgment for \$1,052.21.

OSWEGO, N. Y.—The Fulton & Oswego Falls Street Railway Company has been sold. The new officers are, George N. Burt, Oswego, president; N. N. Stranahan, vice-president; G. D. Hart, secretary and treasurer.

STATEN ISLAND, S. I.—The Staten Island Electric Railroad Company has secured its right of way from South Beach to the proposed new ferry at Mariner's Harbor, and the line must be completed June 1. Thomas Moore is superintendent.

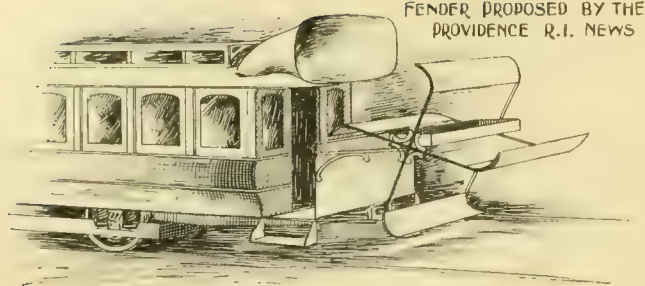
BROOKLYN, N. Y.—Under decree of the United States court the leases and franchises of the Long Island Traction Company will be sold at auction December 6. The foreclosure suit was brought by the New York Guarantee & Indemnity Company.

BROOKLYN, N. Y.—The King's, Queen's & Suffolk County Railroad, through John Sabine Smith, has applied for a franchise to build a bicycle railroad, to be operated by electricity, from the terminus of the King's County Elevated Railroad to Far Rockaway.

BINGHAMTON, N. Y.—The Binghamton Railroad Company which connects Union, Maine, Binghamton and Lestershire, having 7 miles of track has been opened to traffic. G. T. Rogers is president; J. P. E. Clark, general manager; John B. Rogers, treasurer.

BROOKLYN, N. Y.—The East River & Atlantic Ocean Railroad Company has been incorporated, with \$3,000,000 capital, by P. H. Flynn, Silas B. Dutcher, J. C. Brower, F. C. Cocheu, W. J. Studwell, G. S. Studwell. The company is organized to construct 30 miles of railway.

CATSKILL, N. Y.—The Catskill, Cairo & Windham Street Railway Company has been incorporated, with \$100,000 capital, by Louis E. Robert, William S. Robert, Michael W. Conway, William C. Wood, Daniel H. Gilligan, John L. Heins, Jacob Faber, Brooklyn; Daniel W. Sharpe, Catskill; Schuyler W. Mattison, Newark.



NEW YORK, N. Y.—The North End Street Railway Company has been incorporated, with \$5,000,000 capital, to construct 13 miles of electric road, by Daniel H. Shea, Thomas J. Regan, Pierre Jay, Frank P. Ogston, William Shailler, New York; Charles H. Sisson, Mount Vernon; Edward K. Lynch, W. D. Davies, Thomas E. Laughlin, Brooklyn.

SYRACUSE, N. Y.—The Pleasant Beach Amusement Company, room 31 Nottingham building, is projecting the Syracuse, Pleasant Beach & Baldwinsville Electric Railway to be built before the opening of navigation. Those interested are E. A. Powell, president; A. T. Hotaling, Baldwinsville, vice-president; I. M. Price, Philadelphia, secretary and treasurer; directors, John S. Kaufmann, Bruce S. Aldrich, Lewis House, Wallace Tappan of Baldwinsville, A. E. Aldridge, J. L. Daly and W. Judson Smith.

Ohio.

TOLEDO, O.—The Toledo Traction Company wants fenders.

CINCINNATI, O.—Cars must be equipped with fenders by February 15.

CLEVELAND, O.—An ordinance will be introduced in the city council requiring fenders.

ROCKPORT, O.—The Smith Transit Company has been incorporated with \$80,000 capital.

WARREN, O.—An electric line to connect Sharon, Hubbard and Youngstown is being projected.

CLEVELAND, O.—The Cuyahoga Suburban Railway has pending a franchise for 2,000 feet of track.

CANTON, O.—The Canton & East Liverpool Railway Company has been incorporated with \$10,000 capital.

WADSWORTH, O.—The Wadsworth Electric Railway Company has applied for franchises in Summit county.

CINCINNATI, O.—The Cincinnati Street Railway will put down a double track in Delta avenue to Mt. Lookout.

SALEM, O.—The Electric Street Railway Company and the Electric Light & Power Company may be consolidated.

AKRON, O.—The Akron & Cuyahoga Falls Rapid Transit Company will extend its system to many streets in the city.

WOOSTER, O.—Wayne county has granted a franchise to the Cleveland, Wooster & Medina Electric Railway Company.

TOLEDO, O.—The Toledo & Petersburg Electric Railway Company has secured all its franchises, and is ready to begin work.

CLEVELAND, O.—H. A. Everett and Albert Pack are offering a 3 cent fare for an inlet to the city of the Akron suburban road.

WAPAKONETA, O.—The Auglaize Street Railway Company has been granted a franchise for a single track with turnouts, switches, etc.

CINCINNATI, O.—J. H. Charles Smith, an attorney, represents eastern capitalists who expect to build an electric line to Mt. Airy, Groesbeck and Bevis.

YOUNGSTOWN, O.—It is reported that Senator Brice has purchased the controlling interest in the Youngstown Park & Falls Street Railway Company.

FREMONT, O.—Dr. Frank Creager has purchased the Fremont Street Railway for \$8,720. Eastern capitalists are interested, and will extend and improve the system.

CINCINNATI, O.—H. P. Bradford, superintendent of the Cincinnati Incline Plane Railway Company has asked for a permit to relay the Main street track with new rails.

CLEVELAND, O.—S. H. Short, B. Mahler, E. W. Moore, E. G. Tillotson and J. B. Hoge are organizing the Cleveland & Lorain Electric Railway Company, with \$500,000 capital.

XENIA, O.—The Xenia Rapid Transit Company has let the contract for 22 miles of track construction, from Xenia to Springfield, to the George H. Mellen Company, New York.

LANCASTER, O.—The Lancaster Street Railroad has been appraised at \$8,325. H. B. Peters, receiver, says the Company will soon be sold to a syndicate, which will operate the road.

AKRON, O.—The Akron Street Railway Company and Akron General Electric Company have been bought by a New York syndicate of which General Samuel Thomas is the head.

COLUMBUS, O.—The franchise of the Columbus & Buckeye Park Electric Railway, which will connect Columbus, Reynoldsburg, Hebron, Jocktown and Newark, has been extended six months.

DEFIANCE, O.—The Defiance Light & Railway Company has abandoned its electric car service, and is reported to have leased the line to McDougall & Flannagan, who will operate it by horses.

XENIA, O.—George F. Mellen & Co., 111 Broadway, New York, are receiving bids from local contractors for grading for the Rapid Transit Company. The latter has opened an office in the Allen building, Xenia.

CLEVELAND, O.—It is quite likely the Akron, Bedford & Cleveland Electric Railway will have a competitor, parallel with its line. F. N. Wilcox, president of the Cleveland & Akron Railway, says his line will be built.

COLUMBUS, O.—Probat: Judge Hagerty and his associates have had their franchise granted two years ago, extended six months, for the proposed electric line connecting London, Springfield, Dayton, Hamilton and Cincinnati.

SANDUSKY, O.—Clark Rude, promoter of the Bellevue-Sandusky Electric road, says right of way has been secured for the line to North Monroe, Bellvue and Monroe. The Monroe line will be extended to Norwalk.

AKRON, O.—The Akron & Cleveland Electric Railway Company and the Akron & Cuyahoga Falls Rapid Transit Company have combined and construction work will soon begin. C. F. Dunbar, F. M. Chandler and F. N. Wilcox, Cleveland, are interested.

CLEVELAND, O.—The East Lorain Street Railway Company is about ready to build its 24 miles of road. One power-house will be erected at Avon and another at Lake Breeze. William McReynolds is president; J. W. McReynolds, vice-president, and W. J. Gawn, treasurer. It is said Hon. M. A. Hanna is furnishing most of the funds.

Oregon.

PORTLAND, ORE.—A decree of foreclosure for \$452,775 has been entered in the United States circuit court against the Portland Consolidated Street Railway Company in favor of the Mercantile Trust Company, New York.

Pennsylvania.

TARENTUM, PA.—The Tarentum Traction Company will build a bridge.

PITTSBURG, PA.—The Second Avenue Tracion Company will build a car house at Braddock.

PHILADELPHIA, PA.—The Holmesburg & Bristol Railroad will build from Torresdale to Bristol at an early date.

ALLEGHENY, PA.—The franchise of the Pleasant Valley Traction Company was passed over the mayor's veto.

POTTSTOWN, PA.—The Pottstown & West Chester Electric Railway is surveying for 25 miles of electric railway.

BRADFORD, PA.—The Bradford Electric Street Railway Company has an ordinance pending for an electric franchise.

PITTSBURG, PA.—The Fort Pitt Traction Company has taken formal possession of the Citizens' Traction lines which it leased.

SEWICKLEY, PA.—The Ohio Valley Street Railway and the Corapolis, Sewickley & Economy Street Railway are after franchises.

TOWANDA, PA.—A. F. Chapman, Buffalo, N. Y., is contractor for the Towanda & Canton Electric Railway, which will use double-truck cars.

LANSDALE, PA.—It is reported that a company will soon be formed to construct an electric line from Lansdale to Doylestown and Norristown.

LANGHORNE, PA.—G. H. S. Brabaker, Lancaster, has the contract for track laying for the Newtown, Langhorne & Bristol Electric Railway Company.

PITTSBURG, PA.—The Pittsburgh & Monongahela Traction Company has been incorporated with \$12,000 capital to construct two miles of electric road.

REYNOLDSVILLE, PA.—There is a project to build three miles of electric railway to Rathine in connection with a proposed lighting plant at Reynoldsville.

PHILADELPHIA, PA.—The Frankford, Holmesburg & Tacony Electric Railway Company will lay another track, next spring, and become a double-track line.

CHESTER, PA.—The Prospect Street Railway Company will extend its line 2½ miles, through Moore, Rutledge and Morton, to the Delaware county turnpike.

MEADVILLE, PA.—The Meadville Street Railway Company has been granted a franchise on condition of paying \$4,000 bonus and constructing 6½ miles of road within a year.

CHESTER, PA.—John H. Robinson, president of the Media, Middleton, Aston & Chester Trolley Company, says all right of way complications have been removed, and construction is about to begin.

POTTSTOWN, PA.—The Pottstown & West Chester Electric Street Railway Company has been incorporated with \$500,000 capital to construct 22½ miles of electric road. Joseph B. Robinson, Philadelphia, is president.

CARBONDALE, PA.—Executions for \$1,641.21 in each case were entered against the Lackawana Valley Rapid Transit Company and Carbondale & Forest City Passenger Railway Company by the Jackson & Sharp Company.

ALLEGHENY, PA.—The Spring Hill Electric Railway Company, incorporated several months ago with \$30,000 capital, is showing signs of activity. Frederick Erck, W. J. Beckford, J. H. Hespenheide and J. A. Hetzel are interested.

BEAVER FALLS, PA.—The Riverside Electric Railroad Company may be constructed. A charter and right of way were secured three years ago to connect Beaver Falls, Pattersons Heights and Beaver. The stockholders will soon hold a meeting.

READING, PA.—The United Traction Company has been incorporated with \$400,000 capital by William R. McIlvain, Henry C. England, James A. O'Reilly, Samuel E. Rigg, Oliver S. Geiger, to operate the Reading Traction Company system and make improvements.

COCHRANVILLE, PA.—S. W. Smith, Cochranville, director in the company that proposes to construct an electric road from Philadelphia to Lancaster, via West Chester, Doe Run, Unionville, Cochranville, Quarryville and Oxford, reports subscriptions of stock to nearly the full amount of the issue.

CAMBRIDGEBORO, PA.—F. R. Shryock, secretary of the company that is to build 22 miles of electric road, from Meadville to Edinboro, via Saegertown, Venango, Cambridgeboro and Drake's Mills, says the contracts are about to be let. The stockholders of the Meadville Street Railway Company are interested in the project.

CHESTER, PA.—The Chester & State Line Railroad Company has been incorporated with \$50,000 capital to construct 4½ miles of electric road to the intersection of the Delaware state line and the Delaware river. The officers are John Edwin Thompson, St. Louis; William Simpson, Jr.; William Percy Simpson, Joseph B. Townsend, Jr., Overbrook; Charles R. Maguire, William H. Badger, Jr., Wayne; Charles C. Townsend, Philadelphia, directors.

PHILADELPHIA, PA.—The Philadelphia & Essington Railroad Company has been incorporated with \$60,000 capital to build five miles of road from Essington to the Penrose ferry bridge, Philadelphia. William Percy Simpson, Overbrook, is president; directors, John Edwin Thompson, St. Louis; William Simpson, Jr.; Joseph B. Townsend, Jr., Overbrook; Charles R. Maguire, William H. Badger, Jr., Wayne; Charles C. Townsend, Philadelphia; George D. Howell, Edwin A. Howell, Chester.

Rhode Island.

WOONSOCKET, R. I.—The Woonsocket Street Railway Company will build a car-house at Millersville.

South Dakota.

PIERRE, S. D.—Application has been made for a receiver for the Forest City Land & Improvement Company, owner of the Forest City & Sioux City Railway.

Tennessee.

MEMPHIS, TENN.—The street railway franchises have been extended 50 years.

MEMPHIS, TENN.—The Memphis Street Railway will construct three or four miles of road into the suburbs.

KNOXVILLE, TENN.—The Citizens Railway is laying track. In the spring a power house will be built, and the line extended to Arlington.

KNOXVILLE, TENN.—The city has withdrawn its injunction suit against J. Simpson Africa's suburban road. Mr. Africa says he will begin construction at once. The Knoxville Electric Light & Power Company is in the market for three dynamos.

Texas.

SAN ANTONIO, TEX.—The Citizens' Electric & Street Railway Company has changed its name to the San Antonio Edison Company with \$300,000 capital.

AUSTIN, TEX.—The Austin Rapid Transit Railway Company wants several car-loads of 45, 50 or 56 pound relaying T rail. F. D. Rusling, secretary and superintendent. Quote prices f.o.b. Austin.

Utah.

SALT LAKE, UTAH.—O. B. Hardy and W. J. Moorhead have applied for a franchise to operate a street railway and light plant.

Vermont.

SHELBURNE FALLS, VT.—The Shelburne Falls Board of Trade is pushing the project for an electric road to Coleraine.

BURLINGTON, VT.—The Winooski & Burlington Horse Railroad Company has been granted franchises for extensions.

BURLINGTON, VT.—The Winooski & Burlington Horse Railroad Company has been granted an extension by the council. The Burlington & Hinesburg road has been permitted to enter the city under the trolley system.

Virginia.

PORTSMOUTH, VA.—M. W. Mason will probably extend his electric line to Prentis Place.

RICHMOND, VA.—John C. Robertson, Richmond, says he has secured most of the right of way for the proposed electric road connecting Richmond, Midlothian, Bon Air and Huguenot Springs.

SUFFOLK, VA.—L. D. Smith and A. W. Cornick, of Norfolk, are reported to have secured an option on the Suffolk Street Railway, and if the deal is consummated, it is proposed to extend it to Lake Kilby, Suffolk fair grounds, Smithfield and Portsmouth.

Washington.

SEATTLE, WASH.—L. H. Griffith, engineer, late of this place, is en route to Guatemala, Central America, where he will install an electric railway.

West Virginia.

WHEELING, W. VA.—It is reported that a New York syndicate is negotiating for the purchase of the Wheeling Railway Company.

Wisconsin.

GREEN BAY, WIS.—It is reported that the Green Bay Electric Light Company and Fox River Electric Railway Company will be consolidated.

MILWAUKEE, WIS.—The village of Cudahy has granted a franchise to the Milwaukee Street Railway for the extension of its Cudahy branch to South Milwaukee.

MILWAUKEE, WIS.—It is reported that within three months the Milwaukee Street Railway Company will be released from the receivers and a new company organized.

MILWAUKEE, WIS.—Plans have been prepared for the equipment with electricity, next spring, of the White Fish Bay dummy line, owned by the Milwaukee Street Railway.

MADISON, WIS.—The Madison Street Railway, in receiver's hands, has paid \$7,000 on interest and other old accounts in judgment. Road is doing better than ever, with prospects of a still better year. George H. Shaw is manager.

ECLIPSES THEM ALL.

35½ Hours.

Chicago to Jacksonville, Florida.

The Monon route with its customary enterprise has put on a new fast train that makes the run between Chicago and Jacksonville in 35½ hours.

This train is composed of elegant Pullman perfected safety vestibuled open and compartment sleepers, including drawing room and buffet sleepers, as well as comfortable day coaches, with Monon celebrated high-back seats.

This train leaves Chicago daily at 8:32 p. m.; arriving at Cincinnati next morning 7:30, Chattanooga 5:50 p. m., Atlanta 10:40 p. m., reaching Jacksonville at 8:20 the second morning, in ample time to make connection with all lines for points in central and southern Florida.

This is the fastest time ever made by any line between Chicago and Florida.

Frank J. Reed, Gen'l Pass. Agt., Chicago.

City Ticket Office, 232 Clark street, Chicago.

For time cards, pamphlets and all other information, address, L. E. Sessions, N. W. Pass. Agt., Minneapolis, Minn.

VULCANIZED FIBRE.

Vulcanized fibre has now been on the market for 20 years and is recognized as a staple article of commerce in all portions of the civilized world. It was at first used

for mechanical purposes and even before the extensive commercial use of electricity was found to be valuable in a large number of places on railways. Since electricity came into use, however, a very much greater field of usefulness has opened up for it, as it is a good insulator and this, together with its mechanical toughness, makes it the most suitable thing to use in a variety of places in electrical work. Its value in the electrical field is now unquestioned and the Vulcanized Fibre Company of Wilmington, Del., is prepared to take care of a large business from electric railways.

NEW PROCESS RAWHIDE BUSHING.

The New Process Rawhide Company of Syracuse, N. Y., is bringing forward a rawhide bushing for the lining of journal bearings, one of which is shown herewith. The rawhide is put together by the same process as that employed by the makers in manufacturing rawhide pinions, and it is only by virtue of this process controlled by this company that such satisfactory results are obtained. In cases where pressure and speed are moderate it is found that these bushings need no oil. The rawhide of the bushing is treated with oil during manufacture, and oil will



not injure it, but is recommended to be used where pressures or speeds are high. The bushings are furnished in standard sizes and are designed to be simply pressed into place and then reamed out. The satisfactory work of the new process rawhide goods for other uses is a guarantee that the bushings are an excellent article, and we predict an extensive use of this line of goods.

OUTWITTED BY A CONDUCTOR.

Here is a conductor who deserves a promotion. The Brooklyn Heights Railroad Company put in operation a new schedule for running the Flatbush cars, cutting off one through car out of three. Passengers in one of the cars were asked to transfer, but refused to do so. They held an indignation meeting, and although it was dinner time, it was resolved not to leave the car, so the party started down town. They were hoping the conductor would demand their fares, and force them to leave, when they would refuse to pay. He fooled them, however, for he rung up the fares, and made a note of it. Several times before the car got down town, the passengers urged the conductor to collect the fare of one of the number, but he only smiled. When the car got to the city hall, the party alighted to hunt for a restaurant.



IN THE POWER HOUSE

Our canvass of the electric roads of the country for obtaining figures on power plant performance reveals the fact that there are many small and some large roads that rent power from electric light and power companies. The basis on which payment is made varies greatly, as well as the price for which the service is rendered. Thus one road in the cheap coal district of Illinois pays \$200 a month for 5 cars 18 hours a day. A road not far from New York where coal is \$2.75 per ton pays at the rate of $3\frac{1}{2}$ cents per car mile. An Alabama road near coal mines pays $1\frac{3}{4}$ cents per car mile. A central New York road where coal is \$1.95 per ton and the railway and power company are owned by allied interests pays $2\frac{1}{2}$ cents per kilowatt hour, which is about equivalent to $2\frac{3}{4}$ cents per car mile where the loss in voltage is small. The engines are high speed, compound, condensing, direct belted. In the same state is a road paying 3 cents per car mile to a water power company. The Nashville Street Railway pays \$2.60 per car per day. The Paterson, N. J., Railway pays 2 cents per car mile. The Cairo, Ill., Electric Railway gives 1.6 cents per car mile. The Augusta Railway, Augusta, Ga., rents water power at a rate which gives it power at $\frac{3}{4}$ cents per car mile. The Ashland & Catlettsburg, Ky., Street Railway rents power at the rate of \$2 per car per day for 18 hours service per day. So it is seen that there is by no means a uniform system of power buying or an approximately uniform rate of charge. Undoubtedly the most satisfactory method both for buyer and seller is to sell on the basis of so much per kilowatt hour.

* * *

On looking over the figures presented in this and the two previous issues on power plant performance it will be seen that in several items there are curious differences which can not altogether be accounted for by the differences in equipment. It looks very much in some cases as if the steam is not dry and hence the apparent water consumption per electrical horse-power-hour is too high. This is not true in all cases, but our readers can pick out for themselves the reports which probably show wet steam. When a case is found in which the engine consumption of water is very high considering the type of equipment it can generally be found that the coal consumption is not as high as would be expected from the high water consumption, and that the evaporation per pound of coal is also apparently high. This combination

of circumstances points almost without question to wet steam as the source of the bad records for the engines and apparently remarkably good records for the boilers. This matter will be dealt with more specifically when the reports are tabulated. The following reports have been recently received:

No. 14.—Output at switch board 48,000 electrical horse-power-hours, taken by recording wattmeter. Station operated 24 hours a day. Equipment; twenty-one 6 by 18-foot horizontal return flue boilers fired with Murphy mechanical stokers; three 45-inch by 16-foot exhaust heaters, two 40 inch by 12 foot exhaust heaters, two 38-inch by 12-foot exhaust heaters, one 30-inch by 12-foot exhaust heater; one 72-inch by 16-foot exhaust heater; three Cooper simple corliss engines, 28 by 48, belted to line shaft; one Allis simple corliss, 28 by 48, direct belted; three Armington & Sims high speed $18\frac{1}{2}$ by 18 direct belted; three Cooper corliss 30×48 , direct belted. Fuel (Ohio slack) costs at power house \$1.05 per short ton. Results:

Fuel consumption per electrical horse-power-hour.....	3.85 lbs.
Cost of fuel per electrical horse-power-hour.....	\$.0020
Water evaporated per electrical horse-power-hour.....	29.8 lbs.
Water evaporated per pound of coal.....	7.74
Cost station labor per electrical horse-power-hour.....	\$.0010
Cost water per electrical horse-power-hour.....	.0001
Cost oil and waste per electrical horse-power-hour.....	.0001
Total cost power per electrical horse-power-hour.....	.0033

No. 15.— Output about 14,000 electrical horse-power-hours per day. Readings taken hourly. The record is for the year 1894, and the road furnishing it states that it is expected that a much more creditable showing will be made for 1895. Equipment: Six Babcock & Wilcox 278 horse-power boilers; economizer in stack; three triple expansion corliss condensing engines of 1,200 horse-power each belted to line shaft. Fuel is crude oil, costing at the the power house \$.024 per gallon. Results:

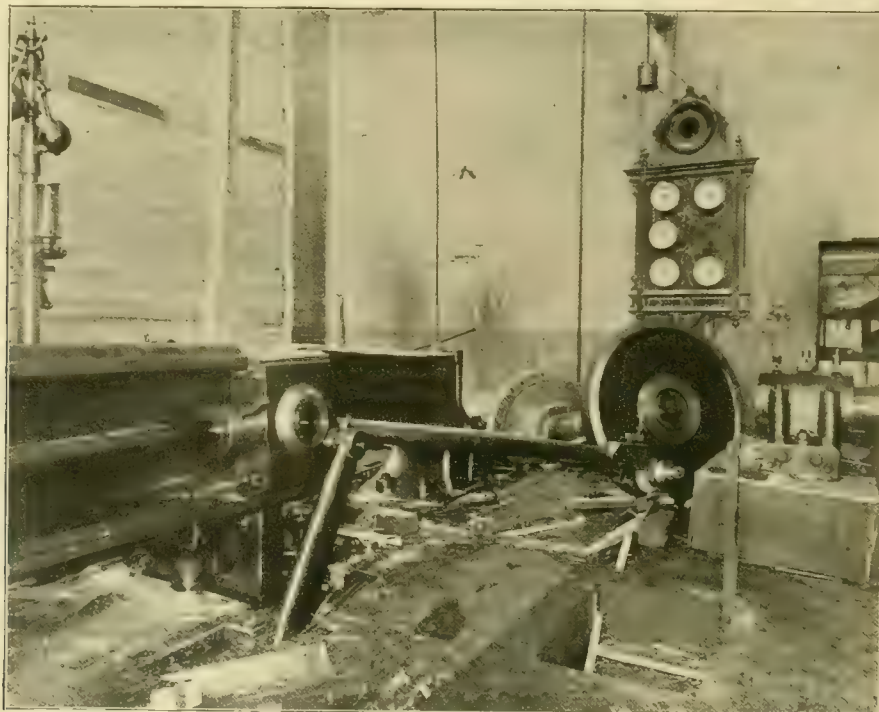
Fuel consumption per electrical horse-power-hour.....	.24 gals.
Cost fuel per electrical horse-power-hour.....	\$.0057
Water evaporated per electrical horse-power-hour.....	24 lbs.
Water evaporated per gallon of oil.....	100 lbs.
Cost station labor per electrical horse-power-hour.....	\$.0014
Interest on cost of station per day at 6 per cent.....	.45
Interest per electrical horse-power-hour.....	.0032
Insurance and taxes per day.....	\$ 4.50
Insurance and taxes per electrical horse-power-hour.....	.0003
Oil and waste per electrical horse-power-hour.....	.0001
Total cost power per electrical horse-power-hour.....	.0108
Cost motive power per motor car mile.....	\$.086



ALBANY FLY WHEEL ACCIDENT.

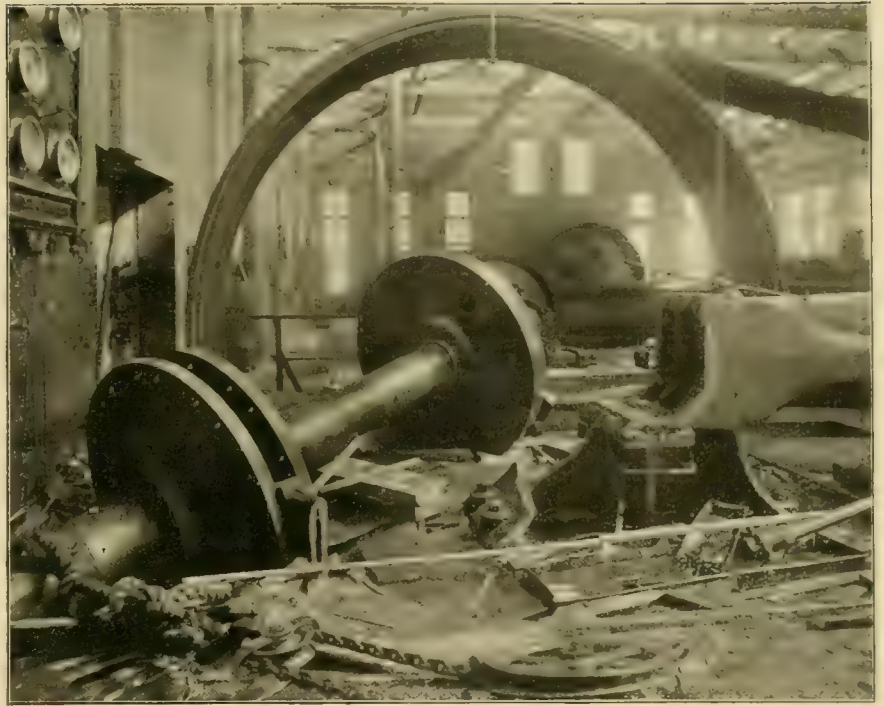
Another fly wheel accident! Electric railway plants are becoming such sufferers from this source that every engineer running a corliss engine in such plants may well feel apprehensive and take every available preventive measure. The last one happened at the Albany Railway power house, November 12. The story of the accident as learned from the testimony in the investigation held two days later is as follows: The first indication of trouble was when John Herlihy, the engineer in charge,

saw the commutator of generator No. 1 sparking badly. This generator is direct belted to a 750-horse-power corliss. He went to the switchboard and seeing that the generator had a heavy overload as compared to the others that were running he opened the circuit breaker and switch to cut it out, thinking that there must be something wrong with the generator. He then saw that the engine was beginning to race, and went over to close the throttle. After the throttle was closed the wheel went



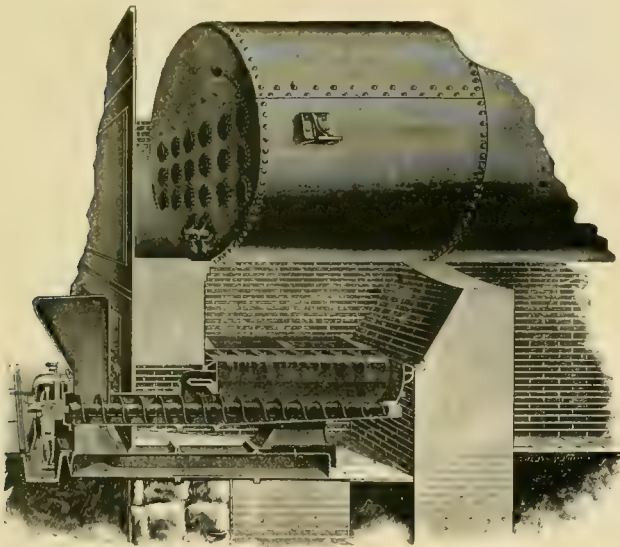
ALBANY FLY WHEEL ACCIDENT.

to pieces. While closing the throttle he looked at the governor and it was apparently responding to the speed of the engine as the arms were up high. It seems to be a plain case of engine racing due to the sudden throwing off of a heavy load. Why the governor did not act as usual will probably never be known. The flying pieces mowed a swath through one wall and part of the roof of the power house. No one in the power house was hurt, but the pieces wrecked two buildings and injured four men in a neighboring saloon, one of whom died. Traffic was delayed less than an hour, as the damage to piping was fortunately slight. This is, we believe, the first case of fly wheel bursting in an electric railway power plant where the trouble was due to a failure of the governor to act, unattended by other complications. Each accident emphasises the necessity of providing means at several places around the room whereby steam can be instantly shut off. In cases like this there is not always time to reach and close the



ALBANY FLY WHEEL ACCIDENT.

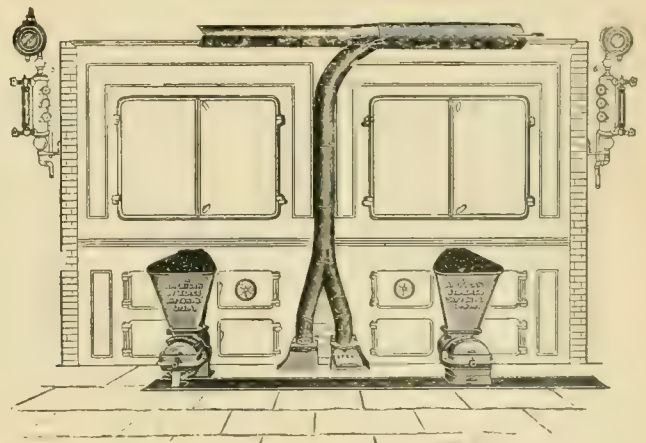
The American Stoker Company, of Dayton, O., is putting out a new mechanical stoker that differs essentially from any of those now in common use. The stoker consists of a hopper, capable of holding one hundred and fifty pounds of coal, placed between the ash-pit doors, occupying but twenty-four inches of space in front of the boiler and allowing the doors free swing. Directly beneath the hopper is an incased gear, driving a "worm," which enters the furnace by an opening but ten inches in diameter in the boiler front. Within the front is a "V" shaped coal-bed, three feet wide at the top, two feet deep and extending the length of the grate bars. Along the top of the coal bed, on each side is



AMERICAN STOKER.

usual throttle valve. General Manager McNamara and his assistant, Mr. Fasset, exhibited great promptness and executive ability in getting cars moving again. Our engravings tell the story of the destruction better than words. The engine is almost a total wreck. One of the most remarkable things is that the pieces nearly all went one way so that one wall of the room was left intact. A new Allis engine will be placed in the addition which is shown adjoining the wrecked engine, and which had just been completed.

* * *



AMERICAN STOKER.

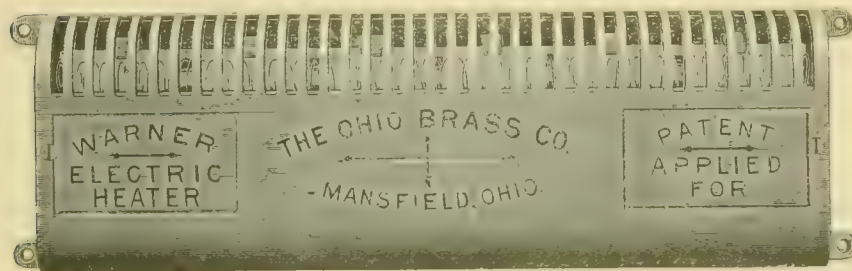
placed a row of heavy iron blocks called "tuyere blocks," through which the air is discharged into the coal. These tuyere blocks are about the size of a brick, weigh 12 pounds each, and are very easily replaced. The coal fed into the hopper is conveyed into the coal

retort by a steel conveyor, and when there is evenly distributed and raised in a body to the level of the "tuyeres." As the coal slowly approaches the fire above, it becomes hot, the volatile gases are released, and mixing with a supply of air from the tuyeres, are exploded into a flame. This air is supplied proportionately to the amount of coal fed, and at a mild pressure.

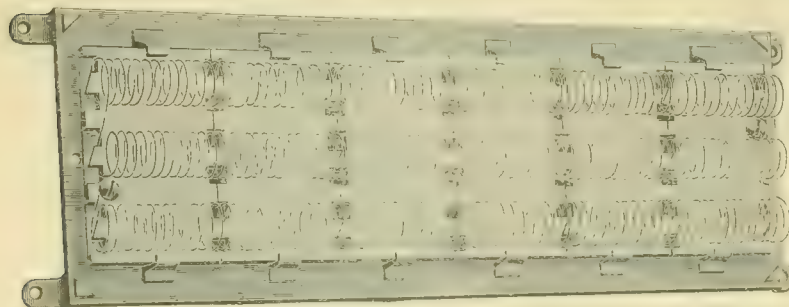
The gases having been drawn from the coal, we have coke, and through this coke bed the smoke-producing gases must pass, so that they cannot fail to be consumed. There are no ashes. The non-combustible part of the coal comes out in the shape of small vitrified clinkers, which are pushed to the side grates by the feeding of the coal. In applying the stoker there is no tearing down of boiler fronts and settings, and putting one in is the work of only a few hours. Hand firing can be resorted to at any time.

WARNER ELECTRIC HEATERS.

A new candidate for honors in the electric heating field is the Warner electric heater made by the Ohio Brass Company, of Mansfield, O. It is the design of W. F. Warner, electrician of the Citizens Street Rail-



way, Muncie, Ind. In its construction two malleable iron castings are employed, one being the frame and the other a cover which protects the wires. The frame is skeleton in form and has several offsets which hold interchangeable porcelain plates in their proper position.



Between the back of the plates and iron frame a heavy sheet of asbestos cushions the plates and gives additional insulation. The wire is held in place by looping several turns of it around protecting lugs formed on both ends of each plate. The dimensions are 26 by 8 by 3 3/4 inches. Facility in repairing is one of its strongest points. There are very few parts and those few are interchangeable. The coils are guaranteed for two years.

CHICAGO CARS TO STOP AT NEAR CROSSING.

When a Chicago alderman cannot find anything else to do, he passes a street car ordinance. Such a condition existed at a recent meeting of the city dads, and an ordinance, which has not at this writing, taken effect,—was passed. It requires all street cars to receive and discharge passengers by stopping at the near crossing. A very brief experiment will prove the folly of the rule. It was a failure in Baltimore; it was even more pronounced a failure in Philadelphia where it was tried, and abandoned within the past few months. In the latter city, however, safety stops are still made at certain cross streets before going over, but not on account of passengers. Only a few weeks ago, a similar ordinance was passed in Cleveland. It went into effect one Monday morning and was repealed the same evening. The public were simply furious. A leading Cleveland manager said to a REVIEW editor:—

"Our city council passed an ordinance compelling the street railroads to stop upon the first crossing of streets so that the front end of the car should not overhang the crossing. As we use the rear door for passengers to get on and leave the car, largely on account of the smaller space where the car is vestibuled in front, it would necessitate people walking to the sidewalk through the mud or else a distance of thirty feet up to the crosswalk, or a much longer distance if they were in the trailer. We were notified by the police that the ordinance would be enforced. I immediately put up signs in the cars calling attention of the public to the ordinance upon Saturday. On Monday the ordinance went into effect and on Monday evening the councilmen introduced an ordinance to repeal the "first crossing" ordinance without any request upon our part. When we saw the ordinance was going to be repealed we started the cars back to the old order of stopping on the second crossing the following morning, so that the life of the ordinance was only one day. Aside from the inconvenience to passengers I think it invited careless driving at street intersections, because many of those driving horses are too reckless now, and it would have been more so if they knew that at the majority of crossings the car stopped before crossing the street."

This is a shining example of meddling in the affairs of something, by legislation, that they know nothing about. In Chicago, with its dirty streets, passengers will be forced to wade through mud from one to two car lengths. Even with horse cars, the horses cannot block the crossing and passengers will all have to walk in the street. A great loss of time will also result here, as the enormous teaming will take advantage of a clear street and will cross ahead of the car; taking much more time than the car would have done.



C. E. Loss & Co., Chicago, are laying track for the Suburban Railway, Chicago, and Strathearn Hendrie, Detroit, 22 miles in all.

Wardwell Bros., Danbury, Conn., have the contract for the line work for the Torresdale & Bristol (Pa.) Electric Railway Company.

The Prouty-Noble Company, of Chicago, is equipping all cable cars of the West and North Chicago Street Railroads with its emergency track brake.

The Peckham Motor Truck & Wheel Company is furnishing 175 more trucks to the Third Avenue Railroad, of New York, to go under closed cars.

The Brooklyn Bridge Company has ordered two sample trucks of the McGuire Manufacturing Company, Chicago, the same style as used by the Lake Street Elevated, Chicago, for electric motor cars.

The Ball Engine Company has issued a handsome catalog describing very fully all of its various types of engines. This publication is of special interest to electric railway men, because of the well-known success of the Ball engines in this particular line of work.

A cable rope made by the Cradock works, Wakefield, England, which was put in service on the London cable tramways, on July 8, 1893, was taken out November 10, 1895. The rope was 30,000 feet long, 1 1/4 inch diameter and made the splendid record of 857 days; 3,465,000 train miles.

The R. D. Nuttall Company, of Allegheny, Pa., came in for a warm endorsement at the Montreal Convention when one of a group of managers said: "If you are in a hurry for goods or want goods of unquestionable quality and workmanship send to the Nuttall Company," and all present agreed with him.

The Root improved water tube boilers installed in the new electric power station of the city of Hamilton, O., by the Abendroth & Root Manufacturing Company, of New York, have shown an economy in operation that is very satisfactory to the city engineers, by whom the boilers were recommended.

The Wheeler Rail Joint Company, of New York, is now receiving some excellent orders for its wedge-joint for replacing joints of other design. One large order of this kind lately received is for replacing the joints on a stretch of the Brooklyn City & Newtown Railroad where the Wheeler joint is doing very well.

The Phoenix Iron Works' Company, of Meadville, Pa., has taken a contract for complete steam power plant for the Oakland Street Railway, Detroit. The Chicago office of the Phoenix Company, 519 Rookery, reports business fair. A complete steam power, electric and water-works plant at Lincoln, Ill., is under way.

The Crane Company, Chicago, has the order for all the steam piping and high pressure valves for the big addition to the power plant of the Louisville Railway. The valves are unusually large, and built to carry extra high pressures. The order was taken by G. A. Hurd, who was in charge of the Crane exhibit at Montreal.

The Ohio Brass Company, of Mansfield, reports large sales of the H. & C. sleet-cutting trolley wheel in consequence of the weather which has prevailed over the north, past experience having convinced electric railway men that this is the most practical means to overcome sleet. The Ohio Brass Company carries a large stock of the H. & C. wheels and can make prompt shipment.

The Simonds Manufacturing Company, Pittsburg, has opened a Boston office at 202 Equitable building. H. H. Hunt, who is in charge, desires all street railway men visiting Boston to make his office their headquarters. Orders placed through Mr. Hunt will receive prompt attention. The Simonds Manufacturing Company reports a large demand for gears and other railway articles.

B. J. Arnold, Marquette building, Chicago, is pushing his electric power station system, which has been installed for the Ft. Dodge Light & Power Company, Ft. Dodge, Ia. The Arnold Electric Power Station Company has been incorporated to introduce the system. It is claimed that any power station can be operated and give as good service with less investment than is usual under the present methods of construction.

Last month the cable in the north side tunnel was taken out, having made the excellent record of 130 days. It was a Cradock rope, made by George Cradock & Co., Wakefield, England. Mr. Wigham, of New York, American agent for the Cradocks, came on to inspect the rope, and was much pleased with its appearance after the long and severe service to which it had been subjected. Cable was 1 5-16 inches in diameter.

The R. D. Nuttall Company, of Allegheny, Pa., is adding largely to its machinery equipments with the double object of maintaining its reputation for prompt execution of orders and lowering costs by increasing output. The gratifying increase which is reported in the Nuttall Company's foreign trade is not surprising to its many friends and customers familiar with the excellence of its goods and attention to the wants of buyers.

The H. Channon Company, of Chicago, does an extensive business in manilla and wire rope for power transmis-

sion in railway plants and in factories. Full and trustworthy information on rope transmission will be given by the company to all interested. The H. Channon Company is a large dealer in cotton duck, being agent for the well-known products of the Columbia Mills Company, and can supply these goods for open car curtains, etc.

The J. C. McNeil Company, Akron, O., manufacturers of steam boilers, have appointed the following representatives: W. M. Kerr & Co., 307 Ferguson building, Pittsburg; George H. Connor, 508 Mutual Life building, Philadelphia; George H. Morrison, 144 High street, Boston; Carrie Engineering Company, 144 Adams Express building, Chicago; Ed. L. Stream, 6 Cotton Exchange, New Orleans; Oliver C. Boyd, Lebanon, Pa.

The Griffin Wheel Company, Chicago, has increased its capital to \$1,250,000. The capacity of the old Northwest Car Wheel Foundry, St. Paul, which was recently purchased by the Griffin Company, will be increased to 300 wheels a day. F. L. Whitcomb, who has represented the company in Detroit, has been appointed general sales agent with headquarters at Chicago. C. F. Kopf, who has so ably served the company as chief clerk, has been rewarded by a promotion to assistant secretary.

The Fitzgerald Van-Dorn Company, Chicago, has received orders for 50 additional automatic coupler equipments for the Metropolitan West Side Elevated Railroad. Additional orders have been received from the Milwaukee Street Railway, South Covington and Cincinnati Street Railway, Consolidated Traction Company, Jersey City, and Pittsburg & Manchester Electric Railway, Pittsburg. The new swivel joint coupler for taking up lost motion of car bodies of trailer cars is meeting with success.

"Micanoid" is a new insulating material for which the Central Electric Company, of Chicago, has been made general western agent. The new insulator is made of mica sheets and flakes compressed by hydraulic pressure in the form of commutator segments, troughs, rings, paper, cloth, etc. After being molded, and while still soft it is passed between calender rolls, making it true to gage and giving a high finish. It is said to be as good an insulator as any offered the trade, besides very hard and durable.

H. J. Wightman & Co., of Scranton, Pa., have received the contract to furnish the line material and rail bonds for the 20 miles of track which the Midland Railway Company, of Staten Island, N. Y., is about to construct. Wightman & Co.'s new overhead switch has found favor everywhere, orders having been received from nearly every state in the Union, and duplicate orders from some of the largest roads in the country. From the Wilkes-Barre & Wyoming Valley Traction Company an order was received for 50 switches and for additional bonds.

The General Electric Company's power and mining department in one month received orders showing that motors are used in the most diverse industries other than

electric traction. Among them were orders for motors to operate a foundry, a tannery, a shoe factory, a watch factory, a yarn factory, woolen mill, powder mill, elevators, hoists for electric cranes, ventilator on a gun boat, electric launches, mining machinery, iron working machinery, and blower for church organs. These orders came from 11 states, Lima, Peru and Rio de Janeiro, Brazil.

The Fitch Salt Company, Bay City, Mich., is supplying large shipments of salt to street railways for track use, and also reports a constantly increasing demand for the Triple Chlorides, a liquid preparation intended to be used instead of salt. While the cost to the consumer is about the same as for salt, the chlorides possess many advantages over dry salt in that, being in liquid form it can be used in a hand sprinkler for curves, switches, etc., and is thus sure to reach the spot where its work is intended, and cannot blow away as dry salt often does. Then, too, its action is immediate, and its effectiveness very high. President Fitch, who has been experimenting for years, pronounces the solution a perfect one for railway use. There is no question but that its use will become very general as its qualities and advantages are understood.

The Phoenix Carbon Manufacturing Company, of St. Louis, is having such an increase in business that the board of directors unanimously decided at a recent meeting, to increase the capital stock from \$100,000 to \$250,000. The increase will be at once paid in and used for extensions and enlargement of plant. The company is organized under the laws of Missouri (which has an anti-trust law) with \$100,000 fully paid up capital. The increased facilities will be gladly welcomed by the many friendly customers of the company. That such a decided increase in plant is justified shows that the business must certainly be in excellent condition.

J. S. Speer, the accomplished secretary of the Partridge Carbon Company, Sandusky, O., has been making the rounds of his western customers, and reports the same general satisfaction among users, which has followed the introduction of this company's products. By their process of manufacture a brush is produced which is entirely free from gritty matter and gives no bother from sparking. In order to properly take care of the western trade, which has assumed very large proportions, a Chicago branch has been opened at 1439 Monadnock building, in charge of J. M. Atkinson & Co., whose acquaintance and high regard among street railway men is well deserved. The Sandusky works are kept constantly in a condition of highest efficiency, and as for the carbons, Mr. Speer puts the whole story in the words "goods always equal to samples, and guaranteed."

The Baltimore Car Wheel Company, Baltimore, manufacturer of the Blakistone fender, is placing it on many roads, where it has been found to give satisfaction in every case. Joseph Hopps, superintendent of the Central Railway Company, Baltimore says the Blakistone

fender has been in use for three years by that company, on its entire equipment, and there has not been a single claim for damages in the class of cases against which fenders are expected to protect. There were 16 cases of parties being struck, that the company believes would have been fatal without it, no person being injured at all. C. S. Clark, superintendent of the Metropolitan Railroad Company, Washington, D. C., whose road has been equipped less than six months with the Blakistone fender, says they have given entire satisfaction. There was at least one accident that would have resulted fatally had it not been for the fender.

FALK JOINT STANDS CHICAGO COLD.

The several roads in Chicago, which in the aggregate put in a good many thousand of the Falk cast welded joints the past summer, have been waiting the advent of severe cold weather with a great deal of interest. During the past two weeks there was no scarcity of zero weather and it came very suddenly, following a rain. This made the test all the more severe as the thermometer, like everything else in Chicago, moves quickly. The breakages have been astonishingly few, and these few have proven to be either a breakage of the rail itself, or where joints broke it was found they were imperfect and contained blow holes. The Falk Company is finishing the work at Providence, R. I., which will complete the season. General Manager Sergeant, of the Boston West End, recently visited Providence for the special purpose of studying the Falk joint, and it decided him to do a large amount of this work next year.

THREE NEW TRUCKS.

The steady progress that electric traction is making in different lines is a severe tax on the inventive and mechanical ability of those who are called upon to design and build the rolling stock. Truck builders especially deserve credit for the present high standard of excellence in their department. Among the latest developments in this line are the mining truck, storage battery truck and new swivel truck built by the Peckham Motor Truck and Wheel Company, of Kingston, N. Y.

The new swivel truck leans toward steam railroad practice, in the connection of car body to trucks, but the meritorious features of the Peckham construction are retained, in the double truss, hot riveted side frame and axle boxes; flexible gear; absence of noise; and prevention of lost motion. The brakes are powerful, though easily applied. The motor is suspended from the side frames in the regular style. The car body rests immediately upon a cross truss which in turn rests upon two half elliptic springs, mounted upon the side frames.

The truck for storage battery cars was designed to leave a large space in its center in which to carry the battery. Hitherto it had been customary to carry batteries in the car body where their great weight racked the timbers apart unless the construction was made extra strong and heavy. The new construction shifts the bur-

den upon the trucks, which, being of the Peckham type, are expected to stand up under the increased load. The two motors are placed outside of the axles. Another change is the increase in the length of the side frame, making the spring base 16 feet.

For hauling mine cars a locomotive has been designed so as to be useful on street railways as well. The locomotive is virtually a Peckham single truck, having the brake and controller mounted low down at one end. Over the axle boxes is a heavy platform on which weights, tools, cranes, etc., may be loaded.

PROUTY-NOBLE BRAKE ON CABLE CAR.

The Chicago City Railway Company is trying the Prouty-Noble brake on a grip car. Although the brake has been running a month, there is no sign of wearing of the disks perceptible to the eye. The track owing to the slippery mud has been in bad condition for braking, but the brake acted perfectly without skidding wheels or causing a jar to the train when it was set. Its action is gentle, yet quick and firm, being much quicker than the brake in use on the other cars.

On the car axle is a spool consisting of two beveled steel disks, which are attached in sections, so it is unnecessary to remove a wheel. One is firmly fixed, while the other has a slight lateral movement, both revolving with the axle, and held in place by collars. Between them is a loose reel to which the brake chain is attached. The brake lever moves another beveled spool that impinges on the spool on the axle, pressing the loose beveled disk against the reel, which is pressed against the fixed disk, and draws up the brake chain, setting the shoes against the wheels. Should the wheels begin to skid, it is only necessary to ease up a bit, which can be done without losing the maximum resistance of the brakes. It is possible to set the brake firmly within $\frac{1}{4}$ revolution of the car wheel. The device can also be operated by the brake handle. On electric cars only 7 inches of space is required. The two spools are kept well oiled and it will require the wearing away of $\frac{3}{4}$ inch of steel from each disk before it will fail to operate.

LAKE STREET L MOTOR CAR TRUCKS.

The McGuire Manufacturing Company, of this city, has delivered the first set of Lake street electric motor trucks, which show great originality in construction. Each truck is designed to carry two G. E. 2,000 motors. The wheel base is limited to 5 feet 6 inches and the train is pulled by the center plates, necessitating a powerful bolster. In this case the truck bolster is really the cross section of a top frame which includes the side bearings and pedestals, and the whole frame swings laterally instead of swinging bolsters as in common steam railroad trucks. The lateral motion of this top frame calls for an entirely new brake hanger. The one used is called by the McGuire people the elastic brake hanger; its greatest peculiarity being that it releases itself without

the usual release springs and will swing laterally to meet the varying positions between the wheels and the truck frame and still hang the shoes in a line vertical with the wheels. The shoes are saftied by a rod being cast into the shoes, the upper end of the rod being attached to the hanger so that should the shoe break at any point of its whole length, or should several breaks occur, they are simply carried by the rod until replaced. It should be understood that every moving part of an elevated truck must be saftied, which means that should any part give way while performing its function there is a second fastening to prevent it falling to the street below, and in doing this the McGuire Company resorted to these novelties. They have the elastic hanger and safety shoe patented and have applied for patents on five other new features. When it is known that each motor measures 50 inches wide by 33 inches high and 25 inches from axle to point of suspension, weighing 4,000 pounds each, it will readily be seen that much ingenuity was required to put two of them into a 5 feet 6 inches wheel base truck. The truck having no end sills, the motors, bolster and complete braking arrangements are contained between the two axles. The weights of these trucks when equipped with motors are 16,000 pounds each.

A DISGRACE TO THE TRADE.

It is an unpleasant duty, but one feel we owe not only our readers, but the reputable concerns which use our advertising pages to call attention to the unbusinesslike and disreputable operations of one John H. Graham who advertises himself as manager of the "Consolidated Railway Supply Company," of Boston. As soon as we became aware of the dishonorable methods of this Graham we immediately refused to continue his advertisement under any circumstances. We endeavor to exercise every precaution in accepting advertisements from only such concerns as are worthy of the confidence

and patronage of the trade. Having been thus deceived we take this, our first opportunity of apologizing to our readers and exposing the man. Since our last issue Graham has been arrested for obtaining money under false pretenses, and we now find his record in one or two of his previous "companies" will not pass muster, and is anything but flattering.

Henry A. Everett, general manager of the Detroit Railway, recently made the REVIEW a pleasant call.

E. A. Hovey, formerly master mechanic of the Chicago City Railway is recovering his health at Albuquerque, N. M.

J. E. Rugg has left the Citizens Traction Company of Pittsburg to become general superintendent of the West End Street Railway of Boston.

C. E. Moore has been appointed master mechanic of the Chicago City Railway. He comes from the position of chief of the blacksmith department of the L. S. & M. S. Railroad.

Percy R. Cradock and Fred H. Wigham, of the firm of Geo. Cradock & Co, cable makers, of Wakefield, Eng., are visiting American street railways, and recently made the REVIEW a pleasant call.

C. D. Wyman, general manager of the Milwaukee lines, has just returned from visiting and studying the railway systems in several large cities, and not forgetting a call greatly enjoyed by the REVIEW force.

On Thanksgiving day the employes of the Crane Company, this city, marched in a body to the residence of President Crane, and presented him with a handsome bronze piece in honor of the 40th anniversary of founding of the company.

E. P. Vining, general manager of the Market Street Railway, San Francisco, married Miss Agnes Eliza Brooks, November 14, 1895, at Brookline, Mass. The bride is a daughter of George Brooks, a prominent wholesale merchant of Boston.

Robert S. Ashe, formerly general manager of the Baltimore & Curtis Bay Railway Company, recently with the Louis K. Comstock Engineering Company, of Chicago, has been appointed general superintendent of the Joliet Street Railway Company. A. G. Bishman is retained as assistant superintendent.

B. F. Harris, Jr., vice-president and general manager of the Urbana & Champaign Electric Railway and Miss May Melish, a young lady of a prominent Cincinnati family, were married at Cincinnati, December 5.

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